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ORIGINAL ARTICLES.

COLORING MATTERS AND FERMENTS.

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In every change in nature, and incessant change is the order of nature, there are two general factors, matter and force. In the organic world, the light and heat of the sun constitutes the unfailing source of power supply for the building up of the almost infinite number and variety of forms. On the other hand, the combining activity of oxygen, which in organic nature is the complement and correlative of solar force, gives to these forms, when living, the capacity of vital expression and finally restores them, when dead, to the condition of inorganic matter.

Force, like matter, is indestructible, capable indeed of infinite changes in direction or modes of expression but never lost. The various manifestations of force which constitutes the phenomena of life are dependent upon definite chemical reactions taking place between substances which nourish, build up and sustain the vital processes of organized forms.

These reactions with the force transmutations which they involve do not, as a rule, occur spontaneously through the direct operation of affinities between the substances taking part in them, but are brought about through the agency of other substances which exercise peculiar dynamic functions. These substances are classed in physiology as coloring matters and ferments. It is to some thoughts concerning principally the first class, that attention is invited in this paper, which is written in the hope that the suggestions offered may prove of sufficient interest to

induce some of the many competent investigators to direct their explorations into a field which, beyond doubt, will richly reward intelligent research. What I have to offer is not an elaboration of new facts, but rather a method of mentally regarding or interpreting facts already brought to light by the labors of others.

Hæmoglobin, the red coloring matter of blood, and chlorophyl, the green coloring matter of plants, stand in complementary relations to each other. They may be considered as placed at the two extremes of a series embracing between them the various catalytic agencies of organic life.

These two substances, together with others intermediate in the scale between them, perform functions of the highest importance in the various transformations of matter and transmutations of force, which constitute the nutritive processes and vital manifestations of organized forms.

Chlorophyl is concerned in building up from inorganic materials organic compounds utilizing the energy of the solar rays, while hæmoglobin is concerned in oxidizing these compounds and liberating the stored up force.

Chlorophyl stands at the base of the nutritive processes of vegetable life and is the *entrepot* for a large part of the force which builds up the organic world, while hæmoglobin is an essential factor in the vital manifestations of animal life and, assisted by its derivatives the coloring matters of bile and urine, restores to inorganic nature the materials and force which

have served their ends in the animal economy.

Chlorophyl, by giving, as it were, specific direction to the vibrations which constitute solar light and heat, tears asunder the atoms of O and C in the compound CO, and of O and H in H_2O , freeing O while the remaining elements are appropriated by the plant in the formation of carbohydrates and other compounds capable of reoxidation. Hæmoglobin, on the other hand, supplies oxygen, breaks up the carbohydrates and other oxidizable compounds and forms CO, and H_2O .

Electricity, magnetism and chemism are closely related forces, if indeed they be not different modes of manifestation of essentially the same force. They all have the same ultimate basis in the capacity of matter for molecular polarization. Each may be developed by another, each converted into another. The special office of magnetism is to effect transmutations of force.

Most of the elements may be arranged into an electro-chemical series with the alkali metals, potassium, sodium, etc., with hydrogen at the positive, and the halogens, chlorine, bromine, etc., with oxygen at the negative end. Occupying a space in the middle of the series are the metals, iron, manganese and chromium. These metals present a strong resemblance in the variety in color of their oxides and salts, their behavior toward oxygen, their magnetic properties and the fact that they may occupy either the acid or basic side of salts. It is by reason of their position in the electro-chemical series, possessing as they do affinities in opposite directions, that the condition of bipolarity may be readily induced in them and they are hence distinctively magnetic. They are sometimes found on one side of the middle line manifesting acid or negative affinities, sometimes on the other manifesting basic or positive affinities, their difference in behavior depending upon special conditions in the different cases.

The coloring matters chlorophyl and hæmoglobin, by virtue of the iron which exists in them in the magnetic condition, possess the property of polarity. Furthermore, in a state of physiological activity, they are constantly undergoing reversals of affinities or poles. This probably involves a true mechanical, molecular motion, the molecules of

chlorophyl and hæmoglobin serving as a mounting so to speak, for the atoms or particles of magnetic iron, and allowing their rotation by the adjustment of their own atoms. Magnetism is dynamic, that is, capable of producing effects, mechanical, electrical or chemical, only when the body in which the magnetic condition exists, or that upon which it acts, is in a state of motion; or the magnetism itself is varying, commencing, increasing, diminishing or ceasing, in which case the molecules themselves of the magnetic substance may be inferred to be in a state of motion. Its special office in nature, as observed before, is the transmutation of other forces, changing their directions so to speak, and specializing their activities. A permanent magnet may be viewed as a static condition of force, motion come to rest, yet embodying a capacity to take up motion and convert it into other modes of force.

The property of two-endedness, of right and left-handedness, though difficult to reduce to a distinct mechanical conception, pertains to light and heat as to the other physical forces. Their capacity for polarization, the reduction to definite planes and directions of the vibrations which constitute the essential nature of these forces, indicates their relation to the other polar forces. Faraday has shown that a ray of polarized light or heat may be deflected from its course by subjecting it to the influence of a magnet.

The color green, occupying as it does the middle of the solar spectrum, is interesting in this connection as an index to the capacity which chlorophyl possesses of abstracting the middle constituent, dividing the solar ray, and giving to the vibrations above and below green in the chromatic scale specific directions by virtue of which they polarize and set in motion the atoms of the magnetic metal, iron, contained in the chlorophyl. The magnetization of the iron with motion superadded, develops electro-chemical force. The condition of polarity and motion induced in the iron is a transitional condition of the force which is received on the one hand as vibratory motion and delivered on the other as electro-chemical force.

This electro-chemical force is expended in tearing apart the atoms of O and C in the compound CO, and of O and H in H_2O and becomes posited as it were in the atoms of O on the one hand and of C and

H on the other, to be again delivered up as heat, mechanical motion, muscular activity, etc., when these atoms again meet at the other border of the organic world. This attractive force of the atoms of C and H in the hydrocarbonaceous compounds formed for the displaced oxygen, is the exact equivalent and complement of the solar energy used in parting them and constitutes the ultimate basis of all force manifestation in organic life.

Plants, utilizing the energy of solar light and heat, manufacture out of materials drawn from the atmosphere and taken up from the soil by the roots, a variety of compounds, starch, fats, albumen, etc. A part of these compounds fall from the elevated plane of "proximate principles" to the condition of simple binary compounds, the measure of which retrograde metamorphosis is the amount of CO_2 exhaled by the plant. This descent from a higher to a lower plane liberates force which in conjunction with external heat and acting through the agency of diastase and perhaps other catalytic agents more or less closely related to chlorophyl, lifts another part of these compounds to the grade of organized vegetable tissue. The greater part, however, remains as reserve stores of material and force, to be either used by the plant itself in the construction of parts subsequently developed, or to serve as food for animals.

Animals receive ready prepared for them in the vegetable kingdom, the materials for their structure embodying the capacities for the force evolutions which constitute the expressions of life. True, much of this material is raised to much higher planes, substances of exceeding complexity, of high molecular weight, being required to meet the demands of the extreme differentiation of form and function in the higher orders of animal life. In this lifting of pabulum for the formation and maintenance of organic structure force is consumed, contributed no doubt by the retrograde metamorphosis of other constituents of the food, but rendered available through the agency of so called ferments. Some of these are, in all probability, products of the ductless glands and as yet but little known.

The great and striking characteristic of animal life however, as distinguished from vegetable life, lies in the fact that its chemical processes are, in the main, reductions

of matter with evolution of force, which finds expression as heat, sensori-motor force, etc. These reduction processes and force liberations are accomplished through the agency of hæmoglobin and its derivatives, the coloring matters of bile and urine. At the top of the scale of organic nature, we find beginning processes the exact reverse and complements of those we found initiated by solar energy through the agency of chlorophyl in the green leaves of plants. These processes end in the complete restoration to inorganic nature of the matter and forces which have performed their parts in the mystic play of that inscrutable something we call life.

The red corpuscles of the blood, by virtue of the iron which exists in them in some sort of union with their hæmoglobin, take up oxygen from the air in the lungs and deliver it up in the capillary circulation, returning with their hæmoglobin in the reduced condition. In making the circuit from the lungs, through the capillaries and back to the lungs, the hæmoglobin changes from the bright red of highest oxygenation to the violet of lowest reduction, passing no doubt through the whole gamut of colors. When it leaves the lungs, it occupies the red or dynamic end, when it returns to the lungs, the violet or chemical end of the chromatic scale, its color at each stage of the declension being the index to its dynamic capacity. At the point of lowest reduction, its dynamic capacity is a minimum, its chemical affinity for oxygen, after it reaches the lungs, a maximum. At the point of highest oxygenation, its chemical affinity for oxygen is satisfied, its dynamic capacity a maximum. At the opposite extreme of the circuit, this chemico-dynamic force, of which the hæmoglobin in its transit is the vehicle, is reconverted into heat and motion by the impact, as it were, of atoms which had been torn apart by the dynamolytic action of chlorophyl in the green leaves of plants.

Chlorophyl and hæmoglobin, with the other catalytic agencies between them, require for the physiological activity certain necessary conditions. One of these is always heat or equivalent force in the ascending constructive, lifting force consuming series on the one hand; another, the presence of oxygen with its capacity of unlocking force in the descending, destructive force releasing series on the

other. Solar force, either as the direct rays of the sun or as diffused daylight is necessary, furnishing as it does the *vis agendi* for the activity of chlorophyl. This activity, with the processes which depend upon it, ceases in the dark. The permanent withdrawal of light starves green-leaved plants to death. It has, however, been experimentally shown that plants will flourish in the electric light which is, after all, but a reproduction of the sun's rays.

Diastase could never imitate and carry forward the process of germination in seeds without the proper degree of heat. Heat is also just as necessary for the germination of an egg as for the sprouting of a seed.

The nature and mode of operation of the various substances which serve to transmute heat into constructive energy under the directive agency of animal and vegetable organisms, appear to me to furnish a rich field for study and practical experimentation.

The alkalinity of the blood and tissues furnishes an all-important condition for the activity of hæmoglobin in the animal economy. The alkalinity of the blood differs at the two extremes of the circuit. In the lungs, it reaches its highest degree because of the exhalation of carbonic acid. In the capillary circulation, it becomes less alkaline from the absorption of carbonic acid. In passing from the lungs to the capillaries, hæmoglobin crosses its equator between acid and basic affinities. In returning to the lungs, it recrosses to its region of positive attractions. In the lungs it is electro-positive and unites with oxygen, which is electro-negative. In the capillaries of the various organs and tissues of the body, it becomes electro-negative, repelling the oxygen.

As regards the effect on oxygen, it is essentially an ozonizing process, in which the atoms of O_2 , the ordinary condition of oxygen, are disassociated and polarized in the same direction. In this condition they cannot unite with each other though possessing in the highest degree the affinities of oxygen.

It would seem, however, that the alkalinity of the blood, with its changes in degree at the extremes of the circuit, does not absolutely endow hæmoglobin with its polarity, or cause of itself alone the reversals of affinities. Blood outside the body

will for a time manifest this property, as evidenced by its changes in color from red to purple or purple to red, according as oxygen is excluded or supplied. Even hæmogoblin if extracted unchanged from fresh blood will manifest this property.

An examination into the rationale of the guaiacum test for blood shows that even the hæmatin of old blood stains possesses a remnant of this property, inasmuch as it is able to convert the antozone of peroxide of hydrogen into ozone. The basis for the property is beyond question in the essential nature of the iron which is contained. It is well known that a certain oxide of iron manifests, like the black oxide of manganese which has an analogous formula, catalytic activity. This peculiar form of activity, when traced to its ultimate nature, will be found to lie in the capacity of these substances for taking on and giving off oxygen, which capacity is itself dependent upon the magnetic nature of the metals, iron and manganese. When black oxide of manganese is mixed with chlorate of potash in the familiar process of preparing oxygen for laboratory purposes, there is needed but the proper degree of heat, molecular motion, to start or accelerate the revolutions of a multitude of molecular magnets, by which electro-chemical force is generated, which tears the oxygen from its combination in chlorate of potash and gives it off in the free state.

The alkalinity of the blood, however, with its changes in degree at the extremes of the circuit, is necessary to the performance of the physiological function of the red corpuscles, by determining the time and place at which the reversals of the oxygen affinities of hæmogoblin occur, causing them to occur at the opportune moment in each case. In the lungs, where alone oxygen is obtainable, the highest oxygen affinity of hæmogoblin is thereby developed. In the capillaries of the various organs and tissues of the body, where oxygen is needed to meet the demands of the ceaseless change, the highest repulsive force of hæmogoblin for oxygen is thus brought into action.

When the blood-cells die, their hæmoglobin undergoes a conversion into a substance which has been called hæmatoidin, the more complex molecule of the former breaking up and the atoms of C, H, N and O, rearranging themselves into

the simpler molecules of the latter. The iron and sulphur are released and, in part, perhaps reappropriated by young cells, and in part used up in the growth of the horny tissues, hair, nails, etc.

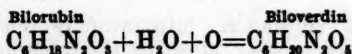
This substance, hæmatoidin, is believed to be identical with bilirubin, the yellow-red coloring matter of bile. Bilirubin has been found in old extravasations of blood evidently produced upon the spot by transformation of hæmoglobin. If red blood-cells be broken up and made to assume a liquid form by alternate freezing and thawing, and the solution injected into the veins of an animal, the operation is followed by a discharge of bilirubin in the urine. Under ordinary conditions, the liver extracts the coloring-matter from the blood-cells as fast as they die, completing their disintegration. Under other conditions, as the introduction into the circulation of certain poisons, or a depraved condition of general nutrition, the cells may die more rapidly than the liver can dispose of their coloring-matter, and jaundice of the hæmotogenous variety occurs, with yellow discoloration of the skin and mucous membranes, and great increase of coloring-matter in the urine.

In phosphorus poisoning, oxygen is abstracted from the blood-cells with such rapidity and to such extent that they are disorganized in great numbers, and this variety of jaundice with ecchémoses, hemorrhages, etc., supervene. In hemorrhagic malarial fever, we have the usual phenomena attendant upon rapid destruction of blood-cells and liberation of coloring-matter. In cirrhosis of the liver, a disease in which this function which the liver has of separating the coloring-matter from dead corpuscles, is interfered with by pressure upon the liver-cells and disturbed circulation, we may have some degree of jaundice and always have increase of coloring-matter in the urine.

With ordinary obstructive jaundice, which results from reabsorption of bile, we are not concerned in this paper.

The coloring-matter of bile exists in *two conditions*, bilirubin and biliverdin, the red and the green matter of bile. The difference between them is one of hydration and oxygenation, biliverdin being derived from bilirubin by the assumption of a molecule of water and an extra atom of oxygen; bilirubin from biliverdin by reversing the process.

Bilirubin



Biliverdin

Experiments have shown that bile drawn directly from the bile ducts *during digestion* is green, though reddish-brown when drawn from the gall bladder. If reddish-brown bile be shaken up with air, or exposed to the action of an oxidizing agent as nitric acid or iodine, its color changes to green. Then if oxygen be excluded by placing it in a bottle and corking tightly, the green changes to reddish-brown again. Bilirubin preëxists in the worn-out and dead corpuscles from which it is extracted by the liver, undergoing, however, an immediate conversion into biliverdin while digestion and absorption are in progress. The coloring-matter of bile, in its two conditions of bilirubin and biliverdin, occupies a place midway in the scale between the red coloring-matter of blood and the green coloring-matter of plants, and performs functions related to that of each, taking part in the vegetative processes of nutrition on the one hand, and the oxidations of animal life on the other.

Glucose, $\text{C}_6\text{H}_{12}\text{O}_6$, the product of the digestion of starch and saccharine substances is absorbed from the intestine by the radicles of the portal vein and conveyed to the liver where it is deposited in the form of glycogen or liver starch $\text{C}_6\text{H}_{10}\text{O}_5$, to be again given off in the form of glucose as required for the needs of the system. In the process of being deposited in the liver, glucose undergoes a dehydration into glycogen; in the process of being given off, glycogen undergoes a hydration into glucose.

It is also known that albuminose, the product of the digestion of the albuminous elements of the food, undergoes a reduction in the liver into blood albumin, losing an atom of oxygen. The dehydration of glucose into glycogen and the deoxidation of albuminose into blood albumin are accomplished by the presence of bilirubin which, at the instant of its extraction from the dead corpuscles, undergoes a conversion into biliverdin, appropriating a molecule of water from the glucose and an atom of oxygen from the albuminose. The liver-cells by a selective action upon the glucose and albuminose of the portal vein upon the one hand, and the coloring-matter of worn-out corpuscles upon the other, brings

these substances into intimate relation with each other, effecting the interchange between them of water and oxygen, converting glucose into glycogen, albuminose into blood albumin, bilirubin into biliverdin.

During the intervals of digestion, quite a different circle of events takes place. During digestion, the blood is receiving more glucose from the intestine than is required for the needs of the system, and there is a surplus which is reduced to the form of glycogen, as we have seen, and stored in the liver for future use. Soon after absorption is completed, however, the liver completes its work of reducing glucose to glycogen, and begins instead to give off its glycogen as glucose. Whereas, in the first place, some agency was required to reduce glucose to glycogen, we now need some means to raise glycogen to glucose. This means is supplied again by the accommodating coloring-matter.* There is abundant evidence that the bile continues to be secreted during the intervals of digestion, that it is always present in the intestine, that it is of a reddish-brown color, its coloring-matter being in the condition of bilirubin, and that it is, for the most part, reabsorbed.

Under the changed condition of things, the bile continuing to find its way into

the empty intestine, is absorbed into the portal and its bilirubin by the assumption of oxygen from the red corpuscles and water from the plasma of the blood, undergoes a conversion into biliverdin. This biliverdin, when it reenters the liver comes in contact with the glycogen and yields up to it its water, becoming reconverted into bilirubin and reconverts the glycogen into glucose, thus rendering it again diffusible when it is swept off into circulation. The atom of oxygen associated with the molecule of water in the biliverdin and liberated with it, is no doubt applied to the final oxidation of nitrogenous substances which have served their ends in the economy, of which reaction the urea found in the liver is the product.

The liver may be regarded as a chemico-vital laboratory in which certain elements of the food are prepared for assimilation, while other substances which have yielded up their capacity for meeting the demands of structure and function are prepared for elimination. In this laboratory the reagent effecting the changes is the coloring-matter, acting under the same conditions of heat and oxygen supply which are necessary for the activity of other allied substances above and before it in the scale.

COMMUNICATIONS.

CHLORAL HYDRATE—SOME OF ITS USES.†

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In conversation with physicians at various times, I have noticed they viewed chloral as merely a hypnotic, and had used it only for the purpose of relieving pain, thereby inducing sleep. I have been a little surprised at this want of knowledge of its other equally valuable properties. Early in my practice I tried to make a few medicines, combined or by themselves, do all that they would for me, and was led into experimentation with them. Chloral came in for its share, because it relieved pain, quieted the nervous

system, and did not paralyze the bowels.

As a *hypnotic*, five grains of chloral combined with laudanum or with one-eighth or one-quarter grain of morphine acts splendidly, the combination intensifying the effects of each and depriving the opiate of its stimulating property. With children by itself, in sweetened water, it has no equal; mixed with paregoric, it is also good.

I *prepare* it as follows: I just cover the amount in my case vial with glycerin—this dissolves it, and a drop is about a drain. In this form it mixes readily with oil or water and is more quickly prepared, and more easily divided into doses, large or small. With castor oil the dose one to

*The liver's work of breaking up dead corpuscles goes on, notwithstanding the necessity as well as the conditions for forming green bile have ceased.

†Read before the Philadelphia County Medical Society by Oscar H. Allis, June 13, 1894.

five grains renders it less nauseating, and does not grip, at the same time producing quiet and rest.

Applied to the skin in eruptive diseases—measles, urticaria—as follows: chloral, 10 grains (drops); carbolic acid, 10 grains (drops); water or oil, 1 to 2 ounces, almost instant relief is experienced of the intense itchings. Or chloral, 10 drops; glycerin and water, each $\frac{1}{2}$ ounces, produces the same effect.

As a mouth-wash: Chloral, 10 grains; glycerin and water, each $\frac{1}{2}$ ounce (a teaspoonful), produces a pleasant cool sensation in salivation, or as a gargle. After holding it for a moment in the mouth it should be rejected and an equal amount of the fresh solution may be swallowed. Carbolic acid (10 drops) added, makes it more effective in ulceration of the mucous coverings. It seems to act on the nerves locally, the same as chloroform by inhalation does on the body.

In toothache: Chloral, camphor, glycerin, carbolic acid, equal quantities, applied on a small piece of cotton after cleaning the cavity will relieve the pain. (Cover with more cotton to fill the cavity). I keep the mixture, ready made, under the name of "Toothache drops," in my medicine case. If the patient has lost sleep I give a full dose of chloral by the mouth.

For ulcerated sore-throat, or ulceration from any cause, such as scalds: Chloral, 10 to 15 drops (grains); water, 1 to 2 ounces, as to age; sugar, to make it palatable to children, a teaspoonful, repeated at short intervals until sleep is induced, then on waking to keep them fully under its influence. My first experience was on my only daughter, four years old. The case was so severe I feared I would lose her, and to get rest for her, gave as above, after having tried everything else I knew of. The almost immediate relief of all the bad symptoms led me to think the medicine acted *otherwise than merely as a rest-producer*. Since then, for ten years I have used it with the utmost satisfaction to myself and patients.

Earache: Camphor, 10 grains; chloral, 10 grains; carbolic acid, 10 grains; castor oil, $\frac{1}{2}$ ounce. Drop into the ear warm. Fill the ear full, apply a piece of cotton wet in warm water to fill the external ear, then a cloth wrung out in hot water as warm as can be borne. I have seen some almost crazy children go to sleep in two or

three minutes and awake free of their troubles.

As an aid to chloroform in surgery or obstetrics, 10 to 15 grains, given twenty minutes before administration of the anæsthetic, seems to intensify the effect and less than one-half of it is needed to produce the desired effect. In my obstetric practice for the last fifteen years I have used it, and have observed but one case where any unpleasant effects were induced. This was a woman with her tenth child. I gave the chloral to relax the system, 10 grains; in half an hour 5 grains more; in half an hour the chloroform. It affected her almost immediately and the child advanced and came away in good style, but the woman seemed to be dead drunk and incapable of moving herself. She slept soundly for several hours and awoke all right. She was conscious and would answer questions, but could not use herself. This was the first time she had taken either of the drugs, and she may have been susceptible—easily affected. Chloral, given before the anæsthetic, seems to tide them over the excited stage of anæsthesia. The first few whiffs of the anæsthetic produce quiet without any excitement. I have used it in a few surgical cases with the same effect. In children a full dose of chloral, and when sleep comes on they are anæsthetized in that state, and the force often necessary, otherwise, is avoided.

In coryza, where the Schneiderian membrane is very irritable, chloral, 10 grains (or drops); castor oil, $\frac{1}{2}$ ounce, used with a soft mop, applied over the surface, after being dried, acts to check the excretion of mucous, and lulls the irritation and the head-pains.

The supposed influence of the drug on the heart has been urged by my friends against its use. I have not seen any unpleasant effects. In any case where there is a chance of any cardiac trouble, it is an easy matter to fortify the heart with a $\frac{1}{2}$ gr. of nitroglycerin. In one delicate woman I did this as a precaution, but even in her case I believe it was not necessary. This summarizes my experience with chloral, and when I tell you I use from five to six pounds a year, you may know that it has a very considerable scope. I never prescribe it in any quantities, so as to create a "habit." In fact, I do not know of a single case of the kind.

RECTAL ABSCESS.*

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I have chosen as a theme for a short paper to-night a subject which may appear at first glance too insignificant for your consideration, but I am sure that it demands serious thought from a surgical standpoint.

It is for the very reason that too little consideration is given abscesses in a general way, and rectal abscesses in a special way, that I desire to bring the subject before the Society this evening. It has been my misfortune to see one patient die from the effects of a rectal abscess, and several others barely rescued from a fatal result from the same cause. It is the common, too common, observation of the surgeon who sees much rectal practice, that abscesses in this region are treated by the physician in a very unsurgical way. Indeed, it seems to be the common practice to instruct those in charge of such cases to avoid all means looking to an early evacuation of pus, but on the contrary to allow nature to do the work of evacuation. In other words, to poultice the threatening abscess until it bursts. From such advice I have seen more than a score of patients that not only had run the risk of sepsis, but had been made invalids for life. If there is one surgical precept that should be taught in preponderance above another, it is, that pus should be evacuated as soon as discovered. Indeed, I believe that the surgeon is justified often in cutting down upon this inflammatory tumor when he *suspects* pus, but has no positive evidence of its presence. I would rather cut into such a tumor and find no pus than to allow an ounce of it to remain in the tissues twenty-four hours. This rule holds good whether the abscess be a cold or hot one, whether it is due to acute conditions or can be traced to a special diathesis, as tubercular, etc. I could not imagine a case better suited to bring discredit upon the physician, or to form a basis for a mal-practice suit, than to allow an abscess to burrow for days or weeks, as is often done, around and through the tissues of the

rectum. If a patient escapes constitutional infection he runs the risk of such local destruction as will make him an invalid for life. Recognizing, then, the necessity for an early evacuation of rectal abscesses, I have only to call your attention to the manner that is usually practiced in opening them. I believe that you will bear me out in saying that the common practice, even with reputable physicians, is to *puncture* these abscesses. It does seem that men, who would not hesitate to amputate an arm or leg, will not only hesitate about opening abscesses around the rectum, but when they do so the smallest instrument possible is used for the purpose. Many patients have told me that a needle was used by the physician for the purpose; and if a knife was used, it was one with the most delicate blade.

In this connection you will permit me to refer to a few cases that I have now under observation:

CASE 1. A young lady, aged twenty-three, was brought to me several weeks ago from a Southern state, giving the following history: About eighteen months ago she gave symptoms of a rectal abscess. A physician saw her, and so pronounced her trouble. The swelling was great, and the pain nearly unbearable. She begged that the abscess be lanced, but her physician informed her that it was not *ripe*, and that she must wait. Three weeks' time was consumed in this waiting, and at last nature accomplished her work and the abscess *broke*. Of course poulticing was kept up both before the bursting of the abscess and after. After inflammatory action had subsided the doctor proceeded to treat the fistulous condition, which of course resulted. An injection plan was inaugurated, iodine, carbolic acid, etc., being the agents that were thrown or injected into the sinuses every few days. The result of this treatment was that a second abscess resulted, this time in the other buttock. This too, was allowed to *take its course*. After she recovered from the second abscess she refused further treatment, and came to me. You can very well imagine the condition in which

*Read before the Louisville Clinical Society, Feb. 27, 1894.

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I found her. A young girl only twenty-three years of age, handsome, prepossessing, and otherwise healthy, crippled beyond measure by this bad and ill-advised treatment. Upon examination I found on one side two external openings, which led into fistulous sinuses, measuring six to eight inches in length, and running in different directions. On the other side I found the buttock entirely riddled with sinuses, cavities, etc., and communicating with the bowel at great depth. The operation necessary to cure this girl required the most extensive wounds and a three months' stay at the Infirmary. The sphincter muscle being the objective point, it required the most careful surgery to preserve it.

Case 2. A young man, aged twenty-four, came to me from a distance. Upon examination I found a large, patulous, indolent ulceration around the rectum. The finger could be run into a cavity fully four inches, and under the flaps of skin to a distance of two inches in different directions. He gave the history of a cold abscess, and the condition I saw was plainly tuberculous. I advised an immediate operation, which consisted in the complete removal by knife, scissors and curette of all tuberculous tissue.

The recital of these two cases will be sufficient for me to base a few remarks upon in regard to the treatment.

There are two things that should be scrupulously followed by the physician having in charge a patient suffering from rectal abscess, viz., early evacuation of pus and free drainage.

Considering the great percentage of cases of this kind that end in fistula, it is the duty of the surgeon to prevent that calamity, and the time to do it is while treating the abscess, which is always the forerunner of the latter. Considering, too, the local ravages that both abscess and fistula make, it is little less than criminal to allow such to occur when the prevention can be so easily practiced. To the layman or the uneducated doctor it may seem preposterous to propose that a patient suffering from a rectal abscess should be chloroformed and operated on, but to the surgeon of experience or a pathological student it would appear eminently proper. In every case of rectal abscess I would suggest the following plan of treatment:

Just as soon as pus is detected, or the surgeon has good reason to suppose that it is present, the patient should be informed of the necessity of a free lancing of the abscess to avoid sepsis or fistula in ano.

Having administered a purgative, and the parts thoroughly cleansed, the anæsthetic should be given, and with a large knife a free incision should be made into the structures. This, of course, causes a free evacuation of pus. An irrigator should be ready with a 1 to 5,000 mercuric solution, and the cavity thoroughly washed with the same. The surgeon's finger should now be introduced into the abscess cavity, and all bridges, loculi, etc., broken down, when a free injection of peroxide of hydrogen should be practiced. A dilator should now be inserted into the rectum and the sphincter muscle freely divulsed. Iodoform gauze should now be introduced well into the cavity, cotton applied, and a T bandage, and the patient put to bed. On the second day these dressings should be removed and the cavity syringed by sol. mercuric or peroxide of hydrogen, and gauze inserted as before. This should be kept up each succeeding day until the cavity has closed and wound healed. No poultices of any kind should be allowed to be applied after the abscess has been opened.

It can be definitely asserted that if this course is pursued in cases of rectal abscess, fistula in ano would become one of the most infrequent of rectal affections, whereas, now, it is claimed by some to be the most frequent. It will be noticed that I have suggested the free divulsion of the sphincter muscle while operating for the abscess. This is done in order that the spasm which naturally affects the muscle during the existence of an abscess be done away with. The contracting of the muscle inordinately at this time would prevent good union, when by resting it everything is made quiescent.

The injunction not to use poultices after lancing can be appreciated by all antiseptic surgeons. If heat is necessary, hot sterilized cloths can be used; however, the tension being relieved by the cut, but little pain is afterward suffered. The old idea was that by poulticing a free discharge of pus was secured, and that pus was so necessary in those days to the healing of wounds.

NEW METHODS EMPLOYED FOR THE RELIEF OF IMPAIRED HEARING, ESPECIALLY BY THE USE OF THE PHONOGRAPH, VIBROMETER, VIBROPHONE, AND METRONO-MIC EAR MASSEUR.*

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I present this short paper in order to direct attention to a comparatively new way of treating the ear, with a view of restoring or benefiting defective hearing, and dissipating tinnitus.

Contrary to former beliefs, hearing is not to any great extent dependent upon the integrity of the drum-head, but rather upon the preservation of the proper relationship of the various parts of the sound-conducting apparatus. It is now known that if the external meatus be clear and the auditory nerve intact, not only may the membrane be perforated but even extensively destroyed, provided the chain of bones be normal and in perfect adaptation, the hearing will be perfect. To illustrate this, I call attention to a case I treated in 1883. In a case of long-standing suppuration with extensive granulations, I succeeded, upon the careful and complete removal of the granulations, and the subsequent subsidence of the middle-ear inflammation, in retaining Shrapnell's membrane, with the chain of bones, in perfect position. The consequence was that the hearing for the voice, as well as metallic sounds, became perfect and has so remained.

Perfect hearing depends then upon the exact balance of the ossicles one to the other, and to their proper relationship to the oval window and drum-head, between which they are suspended. If any or all of these parts are abnormal in any way—as, for instance, as to the weight of one or more of the bones, or if there be any abnormal attachment between the ossicles, or between the stapes and oval window, or any attachment of the drum-head to the inner wall of the middle ear—there will be derangement of that nicety of adjustment, that perfect balance which is necessary to good hearing.

*Read before the Philadelphia County Medical Society, May 23, 1894.

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The membrana tympani may be considered as little more than the outer fixation point of the ossicles—as a protector for the middle ear, in small part, aids the hearing by concentrating all sounds and upon the short process of the mallens.

Seeing the necessity for perfect freedom of motion in this sound-conducting apparatus, we can readily understand the importance of preventing or, should such exist, removing any attachments of these bones to each other or to the surrounding parts. Any effusions upon them—effusions even if unattended by the formation of attachments—may occasion over-weighting of some of these delicate bones, and thus interfere with the proper conductivity of sound. Should these unfortunate conditions occur, we then have impaired hearing, and usually a greater or less degree of tinnitus.

Numerous operations and methods of treatment have been devised for these cases. They aim either to restore the parts to a normal condition, or to conduct the sound directly to the oval and round windows without the intervention of the ossicles. This latter was accomplished either by perforations or destruction of the drum-head, or the removal of one or more of the ossicles, with or without the drum-head. Since Schwartze first removed the drum-head and mallens in 1873, until the present, operations on the ossicles have become more and more frequent, until recently we find one writer reporting some 300 cases of these operations in about two years. Most operators remove the drum-head with one or more of the ossicles, but Jack removes the stapes alone without the drum-head, evidently reasoning that as ankylosis exists almost always at the juncture of the stirrup in the oval window, by thus removing the stapes the sounds will be carried directly to the membrane of the vestibule. I have performed excision with the removal of one or more of the ossicles but twenty-three times. I, however, do not think it should be resorted

to until all other methods to restore mobility have failed. In future I intend to perform it only in such cases as, where after prolonged, careful treatment, especially after the thorough use of the instruments I will show you to-night, I fail to relieve distressing tinnitus or very defective hearing. I will then perform it only as a last resort, as when the ossicles are gone and there is no improvement, there is much probability of future help.

Massage methods, or methods to break up adhesions within the middle ear, may be said to date from the time that Guyot reported the invention of the Eustachian catheter to the Paris Academy in 1724. He not only opened the Eustachian tube, thus relieving the tension of the membrane and ossicles, but forced air through it into the middle ear, thus forcing the membrane and ossicles back into their normal position, loosening or breaking any attachments that had been formed. The methods of Valsalva and Politzer were but applications of Guyot's idea, their object being the same.

It is, however, not of these methods which operate through the Eustachian tube, but of such methods as exert their beneficial action by increasing and diminishing pressure on the membrane and chain of bones, through the external meatus, to which I will call your attention to-night.

Massage methods as applied to the ear can be separated into phono-massage, the massage occasioned by sounds; pneumo-massage, that occasioned by the condensation and rarefaction of air in the meatus; pressure-massage, where direct pressure is applied to the membrane or ossicles, and mixed massage, a combination of pneumo- and phono-massage.

Probably the first method employed to produce massage was by means of the open hand, so adapted to the ear as to produce a suction effect, alternately pushing and removing it with a slightly sliding motion. This method, as well as the one of opening and closing the meatus by the use of finger, as we often see swimmers do, was undoubtedly practised by the ancients.

Cleland in 1771, recommended the sucking of air from the external meatus for therapeutic purposes, but it was later forgotten until Moos brought the method of rarefaction of air in the external meatus

again into use as a means of treatment. A method formerly employed was by means of the suction of a syringe, with an olive-shaped tip. The tip having been adjusted to the meatus, the piston was drawn back, and, by means of the vacuum produced, the membrane was drawn outward; hemorrhage and even rupture of the membrane was often thus occasioned.

The first scientific instrument to accomplish massage, the Siegle otoscope or pneumatic ear speculum, was presented to the profession in 1864. This instrument was followed by the fungoid-shaped balloon of Lucae, and the rarefacteur and masseur of Delstanche. Siegle's otoscope consisted of an air-tight ear speculum closed without by a glass plate, and connected with a tube to which a mouth-piece was attached. By inserting the speculum the membrane could be examined and its movability determined by motion of the mouth. By alternate suction and condensation, massage was accomplished. Lennox Browne improved the instrument by substituting a rubber bulb in place of the mouth-piece, Delstanche substituted a small double-valved air-pump, and then called it the rarefacteur. Later, Delstanche used a tube, inserted into the meatus, and produced rarefaction and condensation by means of a small hand-pump, capable of regulation, calling this the *waskeur*; but in this instrument he omitted the speculum and thus was unable to see just what effect he was producing. Lucae about this time began to use massage directly on the short process of the malleus by means of this elastic pressure sound, alternately pressing and relieving the tension.

In 1884 Sexton used double ear tubes as a method of education of those suffering with defective hearing, apparently unconscious that he was on the threshold of an important discovery. It is of this instrument that Spear said: "It was invaluable to stimulate the auditory nerve whose functions have become impaired by disuse." It remained for Currier to discover that, not only was it a good teaching method, but that the hearing often improved. These were, so far as I know, the first applications of phono-massage.

In 1887 Maloney presented the otophone to the public. This was nothing more than a speaking-tube closed at one end by a diaphragm. He used it not only as a speaking-tube, but also as a method of im-

proving the hearing, by means of the massage it effected on the drum-head and ossicles.

In 1891 Garcey commenced to use the phonograph to improve the hearing; he was followed by Leech and Houghton. Instead of using the ordinary records, they used cylinders with lines made not by sound, but graved more or less deeply. In 1893 McFarlane used the phonograph, with the ordinary cylinders, for the same purpose.

In 1892 Garcey commenced to use a string instrument—the sounds made by the vibrations of the strings of a banjo being conducted to the ears—which he called the vibrometer. This instrument has been very much improved of late, and now consists of four strings stretched over a banjo-frame. The strings are set in vibration by a pronged wheel which, as it revolves over them picks the strings, the sounds being carried to the ear by the ordinary double ear tubes. One string can be thus played, or two strings may be kept in vibration. In addition to this, the instrument is provided with a suction apparatus. There is a diaphragm in an air-tight cavity within the banjo-head, which is moved up and down by the motion of an eccentric on the shaft, and connected with this cavity is a pair of double ear tubes. You are supposed in this way to be able to obtain simple massage, but as a matter of fact there is a great deal of noise traveling into the ears as long as the machine is in motion.

The vibrophone is an instrument introduced last year, the purpose of which is to carry to the ear the sounds of a rapid or slow interrupter of an induction circuit, as well as to produce, at the same time, a distinct change in the air pressure on the drum-head. As originally constituted, it carried sound only, but has been modified as above at my suggestion.

Wilson has used the telephone for the production of ear massage. Semrock has used the tuning-fork for the same purpose. Hundreds of others have experimented with the tuning-fork in the same direction.

Before describing my own apparatus, I will briefly refer to the methods mentioned. The old mechanical methods of applying massage by the hand produced good effects but were crude. Cleland's and Moos's methods labor under the same disadvantage. The Siegle speculum, the rarefacteur

and masseur are all of value, but they cannot be continued as long as many cases demand, nor can they be as carefully regulated as desirable. Sexton's conversation tubes are of value, as is likewise Maloney's otophone, but they are conductors of sound and sound vibrations, and while they independently of this yet produce motion of the membrane and ossicles, this is not capable of exact regulation, nor is there any way of using massage without the sound. This same objection holds also so far as the vibrometer and vibrophone are concerned; neither of them gives massage without sound, although the vibrometer is supposed to answer these requirements.

It seems reasonable to suppose that in some of these cases of defective hearing associated with more or less immobility of the sound-conducting apparatus, the auditory nerve may be exhausted or diseased. We find it so in mill hands and in boiler and sheet-iron workers; their auditory nerves become at first over-stimulated, and later exhausted. In treating such cases, as well as in hyperæsthetic conditions of the auditory nerve, as little sound as possible should be transmitted for fear of occasioning further damage. To treat such cases I found silent or simple pneumo-massage was required. To accomplish this, I constructed a machine in which I had a slow and fast interruptor in connection with an induction coil, and connected with this was an air-tight telephone with a double ear-tube. Each make and break of the current causes a to-and-fro motion of the telephone diaphragm, and this occasions a corresponding motion of the ear drum. Later, I began to use instead of my induction coil interruptors, a metronome to make and break the current, and find it better in every respect. With it I can produce anywhere between forty and two hundred and eight to-and-fro motions of the drum membrane per minute, the amplitude of motion being dependent upon the size of the diaphragm and strength of current, both of which I can regulate. I have called this instrument the metronomic ear masseur.

For some two months I have been experimenting with the phonograph, both as an ear-test and as a remedial agent. For the former purpose I have found it the most accurate and the best test I have

at my command. As a remedial agent, especially for the application of phono-massage, I have found it very valuable. For this purpose I use voice and instrumental records as well as mechanical records. By this I mean records that have been produced by cross-lining the cylinders, or regularly grooving with lines parallel to the axis of the cylinder (making the lines on some cylinders deep, on others shallow; on some close together, on others far apart).

The work with the phonograph has not progressed sufficiently far to allow me to speak as to its true scientific value. I can only say that it has, in my hands, proven to be by far the best phono-massage instrument I have employed, as sounds of any desired pitch or quality, and practically of any required volume, can be thus obtained.

To illustrate the effects of these new instruments (I refer especially to the vibrometer, vibrophone, phonograph, and the metronomic ear masseur) I will present to you but a few of the one hundred and fifty-three patients that I have treated by this method; two of these patients I have here this evening.

In order to disarm those who would contend that the improvement in hearing was in no wise connected with the massage treatment, I would say that I treated some thirteen patients by this method alone with universally good results; and out of some twenty-eight patients whom I had treated in the ordinary manner, without improvement, but on the addition of massage to the previous treatment all but three improved.

In presenting to the State Medical Society a paper on this subject, I classified my cases as follows: Series I. Those who had been treated by me without improvement, and who improved upon the addition of massage treatment. Series II. Those treated by massage alone—all improved. Series III. Those treated by the combination of massage treatment with ordinary local and constitutional measures. Series IV. Deaf-mutes—two cases only, both improved. Series V. Those treated by usual measures with addition of massage without appreciable benefit; of these there were but six in the 153 cases.

I will narrate but one case of each class.

SERIES I., Case 3.—Mr. C. Z., aged seventy-seven years, treated by me in 1884

for eight months; no marked improvement. He has been affected since 1869. He returned to me March 27, 1894, membranes very much thickened with lower half adherent to promontory; watch not heard in either ear, conversation not heard; only hears upon being talked to in ear, and then only with great difficulty. For the past year or two, unable to distinguish the piano tones; has been an expert pianist. After daily treatment for twenty days he informed his friends of his improved hearing, and remarked that for the past two days he can again enjoy the piano, being able to distinguish the tones.

SERIES II., Case 9.—Mr. J. S. S., aged sixty-five years, came March 19, 1894, with great loss of hearing and tinnitus, extending over a period of twelve years—voice-hearing poor. Watch: right ear, three inches; left ear, hard contact. Two treatments a week for three weeks gave him marked improvement of voice-hearing; with watch-hearing, right and left ears, of seven and five inches respectively; tinnitus heard only occasionally.

SERIES III., Case 19.—Mrs. R. W. K., aged thirty-eight years, came March 5, 1894 (a case in which about two years previously I had given the opinion that I did not think I could improve her hearing). Both membranes had large perforations from scarlatinous otitis suppurative thirty-seven years ago; had for years noticed a gradual diminution of hearing. Hearing for voice very poor, watch not heard, tinnitus deep in character. Treatments were given every other day. April 24th she heard a thunder-clap, a sound which she had not heard before for fifteen years. May 9th she heard a dynamite explosion (quarrying) some four miles off. May 17th. Watch: right ear, eight inches; left ear, fifteen inches+; voice-hearing fair. Her friends have been so astonished at her markedly improved hearing that I have heard of this case in many quarters.

SERIES IV., Case 25.—Two cases of deaf-mutes very much improved. Miss E. G. came January 28, 1894, with history that when eighteen months old she had scarlet fever; that the ears were painful; that lymphatic glands below ears enlarged and opened; that from this time on she heard apparently nothing, but felt violent jars only; that she has endeavored to

utter sounds which seemed to resemble words; that two unfavorable opinions had been given by specialists on the case. By careful treating I arrived at the conclusion that the auditory nerve endings were, at least to some extent, sensitive; that however, it took a powerful sensation to excite them, and that it took a long time for a sound message to be perceived by them. For a month I used the usual treatment for such cases. On February 28th I commenced the use of phono-massage and mixed massage, and later pneumo-massage was applied twice a week, and now she can readily hear my watch tick, hears the friction cards easily, and the tuning fork annoys her by reason of the intensity of sound. Voice-hearing is not good, but she hears a loud voice if words are slowly uttered (sluggishness of perception of auditory nerve), and she has increased her vocabulary from *nil* to several hundred words, and is now able to converse with other children quite readily, as well as with her parents.

SERIES V., Case 27.—Miss S. B. came March 15th with history of catarrhal middle ear disease of twelve years standing; tinnitus has been constant for ten years; she has been treated for periods of a year or more by two Philadelphia specialists, but with no material improvement. The membranes are very much thickened and the lower portion is adherent to the promontory. Voice-hearing very poor, watch not heard, friction cards heard occasionally only. After treatments the only change has been a lessening in the frequency of the sounds; they are no longer constant. The case is one of atrophic catarrh.

I will take the liberty of calling attention to another case which illustrates that the improved hearing is not a temporary affair lasting for a few minutes or hours, but that the change for the better is a permanent one. I refer to Case 24.

CASE 24.—Miss G. R. B., aged twenty-two years, came May 3d, with a history of catarrhal disease of middle ears of five years' standing. She had upon three occasions placed herself under the care of specialists in New York and Philadelphia without satisfactory results. The voice-hearing was poor, except when aided by lip reading. Watch: right ear, half inch; left ear, hard contact. Both membranes were retracted, lustreless, and thickened;

very little movement of the membranes could be observed with Siegle speculum. After usual local treatment there was no discernible effect upon the ears; after the use of pneumo-massage for thirty minutes there was a slight increase in hearing, watch being heard—right ear, three inches; left ear, two inches. Two days later, on testing, I found her watch-hearing to be: right ear, two inches; left ear, one inch. After pneumo-treatment, this rose to: right ear, four inches; left ear, three and a half inches. Two days later on testing her, found hearing to be three and a half inches right ear, three and three-quarters inches left ear. After the treatment the hearing rose to: right ear, five inches; left ear, four inches. Two weeks later, May 14, she heard on arrival in Philadelphia, in right ear, three inches +; left ear, two and a half inches +. After treatment, right ear, four and a half inches; left ear, four inches.

It is evident, from what has been said, that massage is a method which will prove of value in the treatment of diseases of the ears, that it will in many cases obviate the necessity of severe operations, and give better results. Unlike these operations, the parts are left intact, so that should massage fail there is still an opportunity for further measures.

It may be applied by any one of four methods which, for convenience, although not strictly accurate, may be termed: 1. Pneumo-massage; 2. Pressure-massage; 3. Phono-massage; and 4. Mixed massage. The method to be employed corresponds to the case in hand; the caution to be observed is, in cases where the internal ear is affected, not to use too violent pneumo-massage, nor too shrill phono-massage, but to apply it most carefully, as otherwise there is danger of labyrinthine hemorrhage.

The time the massage is to be employed varies greatly with the variety employed, and the nature of the case in hand. Pneumo-massage can be used from two minutes in acute cases, to as much as an hour in chronic cases; and from about one minute when the shrill phono-massage is used, to fifteen minutes when the sounds are deep bass tones or are of small volume.

Of course, constitutional and other local treatments are as necessary when this method is employed as without it, although you will observe from my cases here quoted, that cases which had been treated and

thoroughly treated, and yet failed to improve, improved steadily when the massage treatment was adopted. In other cases where the regular ear treatment occasioned no change, the patient was transferred to the massage treatment, and improved markedly in a few treatments.

The following conclusions are a natural inference from the work herein portrayed.

1. Poor hearing, when unconnected with closure of the meatus or disease of the nerve, is usually the result of some want of mobility in the sound-conducting apparatus.

2. This want of mobility can almost always be overcome by the use of massage, especially pneumo-massage applied directly to the membrana tympani or ossicles.

3. That the pneumo-massage in ordinary cases is the most serviceable, phono-massage being especially indicated where there is a necessity of exciting the atony of the auditory nerves caused by disuse.

4. That as the mobility of these parts increases, the hearing is restored and the tinnitus disappears.

5. That the results are most favorable in cases of hypertrophic catarrh, and in cases with retracted and perforated membranes following suppuration; less favorable in the proliferous variety of catarrh; and unfavorable in the atrophic variety and in cases of involvement of the auditory nerve-ending.

6. That the treatment will in great part supplant the removal of the ossicles and similar operations, which operations should never be entered upon for the restoration of hearing or the removal of tinnitus until massage methods have been given a thorough trial.

REFERENCES.

Schwarze: Die chirurgischen Krankheiten des Stuttgart, 1885.

Smith, S. MacCuen: "The Class of Cases in which we may expect good results from Excision of the Membrana Tympani and Ossicles." *Journ. Amer. Med. Assoc.*, Chicago, 1893, xxi, 838.

Smith, S. MacCuen: "Some Remarks on Excision of the Membrana Tympani and Ossicles." *Virginia Med. Month.*, Richmond, 1893-94, xx, pp. 941-947.

Jack, Frederick L.: "The Operation for the Removal of the Stapes." *Trans. Amer. Otol. Soc.*, 1892.

Jack, Frederick L.: "Further Observations on the Removal of the Stapes." *Trans. Amer. Otol. Soc.*, 1893, p. 474.

Jack, Frederick L.: "Removal of the Stapes in Chronic Catarrhal and in Chronic Suppurative Otitis Media." *Burnett's Syst. Dis. of the Ear, Nose, and Throat.* Phila., 1893, vol. i, p. 465.

Guyot: Machines et Inventions Approuvées par l'Académie Royal des Sciences, Paris, 1735 tome iv.

Politzer, Adam: Diseases of the Ear and Adjacent Organs. Phila., 1894.

Politzer, Adam: "Ueber ein neues Heilverfahren gegen Schwerhörigkeit und ohrensausen in Folge von Unwegsamkeit des Eustachian Ohrtrumpete." *Wiener Med. Wochenschrift*, 1863, xlii.

Cleland, Archibald: *Philosophical Transactions*, London, 1744, vol. xli.

Siegle: *Deutsche Klinik*, 1864.

Delatanche, Ch.: "Serie d'Instrument employés dans le Service de l'Hôpital Saint-Jean pour le Traitement des Maladies de l'Oreille et du Nez." *Cong. Internat. d'Otol. et de Laryn.* Paris, 1889, 102-107.

Delatanche, Ch.: *Monatschrift f. Ohren.*, 1886, xx, No. 3.

Browne, Lennox: *London Specialist*, 1881.

Lucas, August: "Ueber eine Methode zur mechanischen Behandlung des Chronischen Beweglichkeit Störungen in schallleitenden Apparat des Gehörorgans" (*Federnde Drucksonde*). *Arch. f. Ohrenheilk.*, Berlin, 1884, xxi, p. 84.

Sexton, Samuel: On the Necessity of Providing for the Better Education of Children with Defective Hearing in the Public Schools, N. Y., 1884, p. 14.

Spear, Edward D.: "Acoustic and Aural Hygiene of the Deaf and Deaf-mutes." *Burnett's Syst.*, 1893, p. 545.

Currier, Prof.: *Annals of the Deaf and Dumb*, Jan. and Oct., 1885.

Burnett, C. H.: *Transactions Phila. County Med. Soc.*, 1887, p. 82. *Med. News*, May 7, 1887.

Maloney, J. A.: "Otacoustic Treatment in Chronic Deafness." *Ann. Ophth. and Otol.*, Kansas City, 1892, i, 55-59.

Maloney, J. A.: "The Otophone—Its History with a Description of the Various Forms, its Use by the Deaf, its Value as an Aid to the Restoration of Hearing and in the Instruction and Development of Hearing and Articulation in the Deaf and Dumb." *Arch. Otol.*, N. Y., 1887, xvi, 177-187.

Garey, Henry F.: "Massage of the Sound-conducting Apparatus of the Ear by means of Vibratory Force." *Journ. Ophth., Otol., and Laryng.*, N. Y., 1893, vol. v, p. 269.

Leech, George A.: The New Method of Curing Deafness by Special Adaption of the Edison Phonograph, N. Y., 1893.

Houghton, H. C.: *Massage of the Ear by means of the Phonograph.* *Journ. Ophth., Otol., and Laryng.*, N. Y., 1892, vol. iv, p. 233.

McFarlane, Murray: "Phonograph as a Method of Treatment of the Middle Ear." *Canada Lancet*, May 1893.

Garey, Henry F.: "The Efficacy of the Vibrometer in Applying Vibratory Massage in Aural Diseases." *Journ. Ophth., Otol., and Laryng.*, N. Y., 1893, vol. v, p. 269.

Wilson, H.: "Vibratory Massage of the Middle Ear by means of the Telephone."

Semrock, J.: "The Tuning-fork as a Remedy in Ear Diseases." *N. Y., Med. Journ.*, 1893, 57-643.

Laustenbach, Louis J.: "Massage Methods for the Relief of Tinnitus and the Improvement of Hearing." *Trans. Penna. State Med. Soc.*, 1894.

Fatty Heart.

In a case of emphysema, accompanied by a fat-laden heart and attacks of spasmodic bronchitis, M. Albert Robin (*La Méd. Mod.*) ordered:

R Sodii arseniat..... gr. 1-64
Pot. iodid..... gr. 3/4
Pulv. nucis vom..... gr. 7/8
Pulv. rhel..... gr. 3/4
Extr. dulcamar..... gr. iss

M. For one pill. Sig.: One pill daily.

—*Medical Bulletin.*

TRANSLATIONS.

THERAPEUTICAL SUGGESTIONS FROM FOREIGN JOURNALS.*

SELENIUM AS A REMEDY LOCALLY.

Dr. Ch. Féré and Demontporcelet (*Wiener Medizinische Presse*, No. 23, 1894) have found selenium to be much more poisonous than sulphur to which it is chemically related. It must first be carefully experimented with before it can be employed internally. In certain skin diseases it will be found to yield much better results than sulphur under the same circumstances. It is a red amorphous powder and is employed under the form of precipitated selenium. They advise the following formula:

R Amorph. precip. selenium..... 2 | o (grs. xxx)
Pure vaseline..... 30 | o (℥j)
For external use.

IODOFORM IN FIBRINOUS RHINITIS.

Dr. M. Vladár (*Pester Med.-Chirurgische Presse*, No. 16, 1894), in a case of fibrinous rhinitis where every means employed seemed to be without effect, insufflated iodoform well into the nostrils after previous irrigation, allowing the patient to respire deeply in order that he might draw it well in, and he was surprised with the results obtained. That night the patient slept for four hours and his nose did not become dry, the tense feeling diminished and the difficult swallowing decreased. The following morning all exudation had disappeared and only a sharply outlined and a but slightly bleeding raw surface remained, which soon healed under treatment by iodoform. No new exudates formed. Since then he has treated five cases with this remedy exclusively and concludes that iodoform is a specific in this disease. This method is to be continued as long as there is any sign of new membranes forming. As the results are rapid, dermatol or the subnitrate of bismuth may be employed to assist granulation. Sometimes one must have recourse to cocaine in order to diminish the sensation of tension and the irritation. No disagreeable effects from its use were observed.

* In charge of the Translator, F. H. Pritchard, A. M., M. D.

IODIDE OF RUBIDIUM.

Prof. Neisser, (*Therapeutische Monatshefte*, No. 5, 1894) claims that this iodide is better tolerated by the stomach, the circulatory and the general system, than the iodide of potash. Its taste is more pleasant and milder. Prof. Schoeller finds it of advantage in elderly people, with diseases of the circulatory system. In several cases where the potash salt was badly borne, this preparation, if carefully used, was tolerated. Prof. Bunge has a favorable opinion of the remedy. The symptoms of iodism do not appear as soon nor as prominently, as with the potassic salt. It caused no gastric disturbances. Employed locally, by instillation, as a 5 per cent. solution in eye diseases, it acted well. Prof. V. Mering states that the iodide of rubidium is better borne and furnishes the same results as the iodide of potash, as it does not disturb the stomach. He thinks it especially indicated in debilitated individuals, with weakened heart's action. Dr. Braunschweig, Dr. Leistikow and Prof. Wolff, also claim for this salt a better action than from the potash compound. It forms white, odorless crystals which are soluble in water. The dose is the same as that of the potash preparation:

R Iodide Rubidium..... 5 | o (℥j grs. xv.)
Distilled Water..... 300 | o (℥vj. ℥ij.)
A tablespoonful three times a day.

ICHTHYOL IN GONORRHOEA.

Dr. Villetti (*Journal De Medicine De Paris* No. 21, 1894) from a numerous series of observations concludes that ichthyol is of service in the treatment of gonorrhoea on account of its being antiphlogistic, analgesic and germicide. He also praises it in cystitis. In gonorrhoea he employs injections of a 5 per cent. solution, while in cystitis a weaker one (1 per cent.) is used.

Diphtheria.

R Carbolic acid..... gtts. viij
Liq. sulph. iron..... ℥j to ℥ij
Glycerine..... ℥i

M. Sig.—Apply to fauces with camel's hair brush two or three times daily.

—Dr. J. Lewis Smith.

CORRESPONDENCE.

NOTE ON HYDROPHOBIA.

EDITOR OF MEDICAL AND SURGICAL REPORTER:

SIR:—Apropos of Dr. Hiram Corson's recent articles in the REPORTER upon the subject Hydrophobia, I herewith direct attention to a method of treatment said to have been highly esteemed during the first quarter of the present century. Placed side by side with modern therapeutic methods, Pasteurism for instance, it savors of the ridiculous, nevertheless it was considered of sufficient value to merit recognition from the Legislature convened at Albany, February 28, 1806. The following as a verbatim copy of an article taken from in Albany, paper bearing date March 24, 1806.

State of New York, Comptroller's office.

Pursuant to the directions of an act entitled, "An act for granting a compensation to Jno. M. Crous, for discovering and publishing a cure for the hydrophobia, or canine madness, passed the 28th of February, 1806, I do hereby certify, that the said John M. Crous hath this day deposited in this office a certain writing, purporting to be the remedy used by him with perfect success, for more than twenty years past for the cure of the hydrophobia or canine madness, which writing is in the words and figures following to wit:

CURE FOR THE BITE OF A MAD DOG.

"The following is an account and prescription of the remedy and cure for the hydrophobia or canine madness, made by John M. Crous, in conformity to an Act of the Legislature of the State of New York, passed at their present session, viz:

1st. Take one ounce of the jaw bone of a dog, burned and pulverized, or pounded to fine dust.

2dly. Take the false tongue of a newly foaled colt; let that also be dried and pulverized—and

3rdly. Take one scruple of the verdigrise, which is raised on the surface of old copper by laying in moist earth; the coppers of George I or II are the purest and best. Mix these ingredients together and if the patient be an adult or full grown, take one common teaspoonful a day, and so in proportion to a child according to its age. In one-hour after, take the filings of the one-half of a copper of the above kind, in a small quantity of water.

The next morning fasting (or before eating) repeat the same as before. This, if complied with after the biting of the dog and before symptoms of madness, will effectually prevent any appearance of the disorder; but if after the symptoms shall appear, a physician must immediately be applied to, to administer the following, viz: Three drachms of verdigrise, of the kind before mentioned, mixed with half an ounce of calomel, to be taken at one dose. This quantity the physician need not fear to administer, as the reaction of the venom then diffused through the whole system of the patient, neutralizes considerably the powerful quality of the medicine—and

Secondly, if in four hours thereafter the patient is not completely relieved, administer four grains of pure opium, or one hundred and twenty drops of liquid laudanum.

N. B.—The patient must be careful to avoid the use of milk for several days after taking any of the foregoing medicine.

JOHN M. CROUS.

Albany ss.

John M. Crous being duly sworn deposeseth, that the above account and prescription for the remedy and cure of the hydrophobia or canine madness, is a just and true account and prescription, and the only one used and practiced by himself for more than twenty years past, and which has never failed of perfect success in any instance of the vast number of unfortunate beings who have been bitten by the mad dog, and who have applied to him, the deponent, for relief.

JOHN M. CROUS.

Sworn the 24th day of March, 1806, before me, James Kent, Chief Justice, &c.

While the above has the flavor of mediæval superstition, one cannot but wish that the average legislator of to-day, was as ready to recognize and further the rapid advance made in scientific medicine, as were our forefathers the crude attempts of a century ago.

Respectfully,

WILLIAM H. SHIPPS.

Bordentown, N. J.

June 16, '94.

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SATURDAY, JULY 7, 1894.

EDITORIAL.

BERI BERI.

The occurrence of beriberi or endemic poly-neuritis at the port of Philadelphia last winter, proves that even so rare adisease as this occasionally falls under our observation, and, with the increased and closer communications between the United States and Japan, China and India, together with the great reduction in time that has been brought about by the increase of speed in the steamships, makes it probable that, in the future, a larger number of cases may be imported. It is more than probable that, under the name of beriberi, a number of conditions are included, each of which is characterized by the symptom of poly-neuritis. Many cases develop from the exclusive use of rice, and it is not improbable that, under these circumstances, the rice is spoiled; in the spoiling a fungus has developed which, when taken, produces the symptoms of this disease. Pellagra, a disease not uncommon in certain portions of Italy, and caused by spoiled corn, produces very marked neuritic symptoms. Reasoning by analogy, one may expect that a similar

change in rice would be able to produce analogous changes in the nervous system. It is very certain that a number of the cases presenting the clinical picture of endemic poly-neuritis are produced by decomposing fish, cases of which have been reported by authors in this and other countries. In at least three of the cases that occurred at the Lazaretto this causation was unmistakable, the men having existed chiefly upon fish, much of which was decomposed, for the greater part of the voyage, which lasted 80 days. Muscarin and other chemical poisons are able to produce well-marked inflammatory changes in the nervous system, and one may readily understand how decomposing fish could produce multiple neuritis.

As Scheube has so well stated in his recent admirable monograph on this disease, beriberi is not contagious, at least in the sense that measles is communicated from the sick to the well, but is more like malaria in its transportability. Numerous bacteriological studies of beriberi have been made during the past 15 years, but the

results are contradictory and unsatisfactory, so that, in our present state of knowledge, we are compelled to admit that no definite organism has been proven to be the cause of this disease.

The diagnosis is easy when the possibility of the occurrence of this disease is taken into consideration, and where it does not occur in the so-called rudimentary forms, where the symptoms are all poorly developed. The well-known atrophic and dropsical forms are easily recognized.

The mortality from this disease is low,

and varies in different epidemics from 5 to 15 per cent.

The treatment is purely symptomatic in view of our ignorance as to the essential cause of beriberi. The treatment of the neuritis is the same as for that from other causes; the cardiac phenomena and dilatation is best overcome by rest in bed and the use of full doses of digitalis, to which may be added strychnia. Good hygienic and climatic surroundings are particularly beneficial, and should be secured to the patient when possible.

SUPERSTITION IN NEW YORK.

In the *New York World*, June 20th, we find the following advertisement:

"CAUL FOR SALE, reasonable. Address ———, box ———, World, uptown."

It is more than two centuries since Sir Thomas Browne wrote—"Great conceits are raised of the involution or membranous covering, commonly called the silly-haw, that sometimes is found about the heads of children upon their birth, and is therefore preserved with great care, not only as medical in diseases, but effectual in success, concerning the infant and others, which is surely no more than a continued superstition. For hereof we read in the Life of Antoninus, delivered by Spartianus, that children are born sometimes with this natural cap; which midwives were wont to sell to credulous lawyers, who had an opinion it advantaged their promotion." In a foot note the editor states that "even till recently the opinion has been held, that a child's caul would preserve a person from drowning. In the *Times* of May 6, 1814, were three advertisements of fine cauls to be sold at considerable prices specified."

That this superstition still lives in New York City is certainly remarkable. We wonder if the purchasers of cauls are law-

yers who desire to be eloquent, or persons exposed to the perils of ocean travel. It will cost less to buy a caul than to go to Ireland and kiss the Blarney Stone, an osculation which few but fools would attempt, when the difficulty and danger of the effort appear; it would cost less too, than the ordinary life preserver, and might dispense with life boats. How profitable the sale of cauls might be made by maternities. Here is a branch of infant industry which needs no protection, and who knows how vastly it may extend, if the advertisement we have quoted can be taken as a sign of the times, or even as one of the ways of the world!

Chronic Diarrhoea.

\mathcal{R}	Pulv. ipecacuanhae	gr. x
	Pulv. populus trem	Si
	Pulv. capsici	Si ss
	Pulv. xanthoxylum	Si
	Pulv. myrica cerif.	Si

Mix and make into four-grain pills.

—Dr. W. C. Buckley in *Southern Med. Record*.

Chronic Cystitis.

\mathcal{R}	Tr. cellinssoniae	3vi
	Copaiba	3iij
	Liq. morphinae	3ss
	Liq. potassae	3ss
	Ol. menth. pip	m.ijj
	Aq. camphorae q. s. ad	3vi

M. Sig.—A tablespoonful to be taken every four hours.

—Dr. Chevers in *Medical Press and Circular*.

ABSTRACTS.

DYSMENORRHOEA.

Dr. Howard Kelly, of Baltimore, maintains with cogent reasons and no uncertain voice the proposition that dysmenorrhœa is not a disease *per se* and of striking importance, that it is a symptom only of an inflammatory product or new growth in the pelvis and *outside* the uterus. It is necessarily implied in his argument, though Dr. Kelly does not state it explicitly, that the causes of dysmenorrhœa operate by an interference with the normal circulation of blood in the pelvic vessels. For only in this way could extra-uterine inflammation and small fibromata cause pain with the menstrual flux. Another notable fact is that Dr. Kelly makes no mention of the still popular myth "obstructive dysmenorrhœa," which is defined by its advocates as a painful flux induced *directly* by flexions of the uterus which, by narrowing the canal just above the cervical junction, interfere with the free escape of the menstrual blood. Nor does he give any intra-uterine conditions as *causes* of this symptom; even the reigning fad "endometritis" is not referred to as a causal factor.

We have always believed that both dysmenorrhœa and endometritis were symptoms of some form of extra-uterine inflammation, whether in the neighborhood of the uterus or other pelvic organ, which by its presence interferes with the normal function of the afferent and efferent vessels supplying the organ involved. The periodic character of the pain is easily appreciated if we consider that at the time of menstruation the pelvic blood vessels are many times increased in size and an inflammatory swelling of any character in the pelvis, which during the intermenstrual period might interfere little with the pelvic circulation, would in the dilated state of these vessels prove a most serious obstruction to the necessary flux. Especially is this true of inflammatory thickening of the connective tissue which furnishes support to the blood-vessels in the anterior and broad ligaments of the uterus. Between the reduplication of peritoneum which forms these ligaments pass many of the largest vessels in the pelvis, supported and surrounded, as are blood-vessels in all

parts of the body, by trabeculæ of connective tissue. As this tissue in these ligaments is necessarily of small amount, a slight increase of its cells, as in congestion or inflammation, must prove a serious obstruction to the function of its enfolded vessels when these are dilated. The effect of new growths as a factor in obstruction will to a great extent depend upon their situation.

The *raison d'être* of our belief that this is the rational explanation of dysmenorrhœa is the same cogent one adduced by Dr. Kelly. We have never seen a case of this symptom in which the evidences of extra-uterine inflammation or the presence of a new growth was not clearly marked, and we have never failed absolutely to cure the dysmenorrhœa when we have applied our treatment directly to the offending part—whether peritoneal or cellular inflammation, diseased tube or ovary, new growths or inflammatory adhesions. As to so-called "obstructive dysmenorrhœa," it fails to appeal to our reason that a flexed uterus through whose canal a large-sized sound can be immediately and easily passed (as may frequently be done in these cases) can be the direct cause, *per se*, of obstruction to the outflow of blood.

We believe, further, that when the profession at large comes to recognize flexures of all kinds occurring in a normally developed uterus as a symptom merely which indicates the presence of an obstruction, somewhere in the pelvis, to the normal flow of blood to and from the uterus, many a puzzling case will receive its happy solution.—*New York Journal of Gynecology and Obstetrics.*

Scabies.

R	Glycerin.....	ʒvi
	Gum tragacanth.....	gr. lxxv
	Flowers of sulphur.....	ʒij
	Subcarbonate of potassium.....	ʒi
	Essence of mint.....	ʒss
	Essence of lavender.....	ʒss
	Essence of cinnamon.....	ʒss
	Essence of cloves.....	ʒss

M.—*Prof. Fournier in La Tribune Medicale*

Neurasthenia.

R	Zinci valerianat.....	gr. xx
	Quin. valerianat.....	gr. xx
	Ferri valerianat.....	gr. xx

Mix for 20 pills. Sig.—One three times daily.

IS MEMBRANEOUS CROUP DIPHTHERIA?

Notwithstanding the investigations which this question has provoked during the last decade, there is still quite a diversity of opinion concerning the identity of these two affections, and considerable time must elapse ere a positive answer may be given to the query which forms the title of this paper.

In the past few years the bacteriologist and microscopist have stepped prominently to the foreground, and to their indefatigable labors and their valuable investigations and experimentation are we indebted for the marvelously rapid strides forward which medical science has taken. Our ideas of the etiology of disease have radically changed, and in consequence of our increased knowledge in this direction our methods of preventing and treating disease have become much more effective.

Through these bacteriologic investigations the discussion has arisen concerning the identity of membranous croup and diphtheria, and although the investigations in this matter may be said to be yet in their infancy, they have proceeded sufficiently far to convince many of the workers that the two diseases are one and the same, viewed from an etiologic standpoint.

As I stated, however, these investigations have but recently been commenced, and in this controversy I fear that we have depended too largely upon the statements of our friends, the bacteriologists, and paid insufficient attention to those men who see disease at the bedside as well as in the laboratory. The opinions of intelligent men who are daily in contact with the clinical manifestations of disease are certainly of great importance.

In treating this subject, I shall commence with this consideration of the etiology of diphtheria, as it is generally accepted at the present time. Without burdening you with a discussion of the predisposing causes, with which you are all familiar, I will proceed at once to the exciting cause which is contagion.

The disease is now known as the Klebs-Löffler bacillus, which was first described by Klebs and afterwards more extensively studied by Löffler. The production of the false membrane is the primary or local result, while the secondary or constitutional symptoms are due to the absorption

of the poison generated by the Klebs-Löffler bacillus.

In the examination of the diphtheritic membrane, however, it has not uncommonly occurred that the characteristic bacillus was absent, and only streptococci, staphylococci, and at times other cocci were present.

The streptococcus, staphylococcus, etc., were also found in those cases, wherein the Klebs-Löffler bacillus existed, and in these cases the attacks were almost invariably more severe than when these cocci were absent. This fact has been accounted for by the supposition that these cocci penetrated parts that the Klebs-Löffler bacillus did not reach, it being confined entirely to the membrane.

Baginsky, in a paper recently read before the Berlin Medical Society gave the following statistics: Out of 154 cases of diphtheria he obtained cultures of the Klebs-Löffler bacillus in 118 instances. In the remaining thirty-six cases the streptococcus and staphylococcus alone were found; of this latter class, thirty-two of the cases terminated in complete recovery, unhindered by any complications.

From these observations, Baginsky is strongly inclined to the opinion that there occur two separate and distinct forms of diphtheria; a true diphtheria having for its cause the Klebs-Löffler bacillus; and a pseudo-diphtheria, in which streptococci and other cocci are the etiologic factors. Dr. T. M. Prudden, of New York, publishes an account of his investigations, which comprises twenty-four cases. A vast majority of these cases occurred as a complication or sequel to scarlatina, and in none was he able to demonstrate the presence of the Klebs-Löffler bacillus. Martin publishes an account of the examination of 200 cases, in 79 of which the characteristic bacillus was absent, and in this latter class the mortality was very markedly lower than in those cases characterized by the presence of this bacillus.

Dr. Wm. H. Park, of New York, states that in 127 cases in which the Klebs-Löffler bacillus was found to be present, the mortality was 34.2 per cent. while in 79 cases in which it was absent,

the mortality was but 4.3 per cent. Park also says:*

"The inflammation caused by the streptococci and to a less extent by other cocci, differ greatly. They may be conveniently divided into :

1. Pseudo-membranous angina.
2. Pseudo-membranous laryngitis.
3. Cronpous tonsillitis.
4. Follicular tonsillitis.
5. Acute pharyngitis and tonsillitis without exudate.
6. Cases similar to all the preceding, but complicating infectious diseases."

From the above facts I would glean the following points, the correctness of which is accepted by many.

1. That those cases which we have heretofore diagnosed as diphtheria are divided into two classes, one of which constitutes true diphtheria, the etiologic factor of which is the Klebs-Löffler bacillus, while the other class consists of cases of exudative tonsillitis or pharyngitis, caused by the presence of streptococci, staphylococci, etc.

2. That true diphtheria is a disease attended with a very high death rate, the severity of the affection being caused by the absorption of a toxalbumin, which is generated by the Klebs-Löffler bacillus, and which produces septicemia, paralysis, albuminuria, ganglionic engorgements, etc.

3. That uncomplicated exudative pharyngitis or tonsillitis (so-called pseudo-diphtheria) is followed in a vast majority of cases by complete recovery.

4. That only the true diphtheria is contagious.

I will next briefly consider the etiology of that affection known as membranous croup. The exciting causes of this affection were until recently supposed to be exposure to cold and moisture, and the infectious diseases, contagion having no etiologic importance.

It is now claimed by many writers of authority that the disease is produced by the Klebs-Löffler bacillus, and is in consequence diphtheria.

Frankel records four cases of idiopathic membranous laryngitis, in none of which was there any membrane found in the fauces either before or after death; but in all four of these cases pure cultures of the

Klebs-Löffler bacillus were obtained; and he concludes as a result of his investigations that idiopathic membranous laryngitis and diphtheria are etiologically identical.

Other investigators whose opinions are also worthy of respect and consideration have arrived at practically the same conclusion.

It should be remembered, however, that the examinations of the membrane of croup have been comparatively few, and, although we have proof positive that many cases of croup are in reality true diphtheria, the investigations have not as yet proceeded sufficiently far to admit of the opinion that all cases are produced by the characteristic diphtheria bacillus, or to make such opinions of any great value.

If, however, this is the case, then membranous croup must of necessity be a highly contagious disease, and right here is the stumbling block in the pathway of the advocates of this theory.

In studying the literature of the subject I have been unable to obtain any tangible evidence of the contagiousness of this affection. On the contrary, I find abundant testimony to the effect that the possibility of communication from one to another does not exist.

Osler, in his recent work on the "Practice of Medicine," states that he has twice observed cases of membranous croup in the Infants' Home in Baltimore where the conditions favorable to the spread of the disease existed, yet no other cases occurred. Other authorities agree with this opinion.

It has been my own misfortune to have had in my charge, at various times, four cases which I believed to be idiopathic membranous laryngitis, the last one occurring about one year ago.

At the time of my attendance upon these cases I gave little or no thought to the possibility of contagion, especially as there was no exudate visible on the fauces. Consequently no precautionary measures whatsoever were taken. The patients were not isolated, other children being allowed the freedom of the sick chamber.

In each of these cases there were other children in the family, of an age rendering them susceptible to contagion. In one other family there were four other children under the age of twelve years. Neighbor children were also allowed by

*Annual of the Universal Medical Sciences, 1893, Vol. 1.

the family in and out of the room and were frequently in close contact to patient. This occurred in two cases. In not one of these four families did there develop a case of diphtheria, neither was there an appearance of the disease in any of these neighborhoods. It seems to me that these cases would have formed excellent nuclei for an epidemic had the trouble been true diphtheria.

Such experiences have occurred, I have no doubt, to nearly every one within the sound of my voice. What would be the result if we were to handle a case of diphtheria in this fashion? We would undoubtedly have a nest of diphtheria to pay for our negligence. It may be said in answer to this, that in the majority of cases we have but one patient in the family, the disease not extending to other members. This is true, but the precaution every physician takes to prevent the spread of the disease is the reason for it. How many physicians five years ago took these same precautionary measures in membranous croup?

In further support of the view that many cases of membranous laryngitis are due to causes other than diphtheria, permit me to briefly present some statistical facts.** From 1775 to 1850, diphtheria was almost or quite unknown in this country and in Great Britain, but many cases of non-contagious membranous laryngitis occurred during this period.

In Philadelphia from 1846 to 1849 the annual mortality from croup was from 111 to 312. Do deaths from diphtheria are recorded during this period. From 1860 to 1879 the annual mortality from croup ranged from 185 to 455, while from diphtheria it was from 110 to 708.

Previous to 1859, when diphtheria made its appearance in Philadelphia, there had occurred altogether 3,078 deaths from croup, during which period, no diphtheria was encountered so far as is known.

In New York City previous to 1858, but three deaths from diphtheria occurred during the present century, while croup had been more or less prevalent.

From 1858 to 1875 the annual death rate from croup ranged from 338 to 758, while that from diphtheria was from 5 to 2, 329. Dr. Lewis Smith, in this connection makes the following observation: "It is evident that most of the cases of

croup occurring in New York prior to 1858 were due to other causes than diphtheria. It seems hardly probable that so many cases occurring in the hands of hundreds of skilled practitioners should have presented none of those symptoms which we now recognize as characteristic of diphtheria, especially septicemia. It is probably an acute, non-contagious, non-infectious inflammation of the larynx, local in character. But there is also a true diphtheria (laryngeal), and this is the more common form at the present time."

The two diseases present some differences in their clinical aspects. In diphtheria the initial symptoms are slight chilliness, fever, aching in back and limbs, etc. In croup the first symptoms are slight hoarseness accompanied by a rough cough, while there is little or no elevation of temperature.

In diphtheria, the temperature gradually rises, generally reaching 108 or higher, while in croup the temperature is ordinarily much lower than this and not infrequently it remains normal. In diphtheria the first indication of local trouble is slight redness of the fauces and more or less difficulty in deglutition. In croup we have in addition to the cough and hoarseness, which gradually increase in severity, dyspnea, which gradually becomes more and more intense.

In diphtheria, the exudate in the vast majority of cases makes its initial appearance upon the tonsils, later extending to the pillars of the fauces, the uvula and even to the posterior pharyngeal wall; later, in some cases extending into the posterior nares or downward into the larynx, trachea and bronchi. In croup, the membrane invariably first appears in the larynx, from this point extending upward or downward or both. In diphtheria, we generally have a characteristic glandular swelling, which is absent in croup. Constitutional symptoms are prominent in the former disease and absent in the latter. In croup, all the symptoms are rapidly increased in severity, the dyspnea becoming intense. Cyanosis soon appears, and death generally closes the scene.

Should the diphtheria be laryngeal in character, there would not be such a wide divergence in the symptoms. Still the fever would be higher than in croup, glandular swelling would occur and the constitutional symptoms be marked.

* Reference Hand-book of Medical Sciences.

Two of the cases of croup in my own practice, to which I referred, had absolutely no rise of temperature at any time, and in all four of the cases no glandular swelling existed and no symptoms characteristic of diphtheria were present.

In the earlier portion of this paper we have seen that there occurs a true diphtheria, highly contagious and very fatal; and a so-called pseudo diphtheria not contagious and much less fatal than the former affection. We have seen that the etiology of these two diseases is very different.

Is it not possible, nay, even probable, that these same conditions prevail with reference to the laryngeal mucous membrane? I would answer the question affirmatively, and would further strengthen this opinion by studying the history of diphtheria and croup as they occurred in this country during the present century, and to a certain extent by the study of the clinical manifestations of the two affections.

The conclusions, then, which I have reached are as follows:

1. That there are two forms of membranous laryngitis; one a true diphtheria, produced by the Klebs-Löffler bacillus and

the other non-contagious membranous laryngitis, produced, if you please, by streptococci, staphylococci, etc.; and that both of these types are very fatal.

2. That membranous croup as we have heretofore understood it, is a disease of much less frequency than was formerly supposed.

3. That it being impracticable to make a bacteriologic examination of the membrane in many cases, and as this is the only method by which we may be absolutely positive of our diagnosis, the same precautionary measures should be taken to prevent a possible spread of the disease as would be adopted in a case known to be diphtheria.

Those who believe that a non-contagious membranous croup does not exist will hardly be favorably impressed with the idea of carding the house, isolating the child, and causing any other children who may be members of the family, to remain from school several weeks, but in the light of our present knowledge upon the subject it is the only safe method to pursue, unless a careful microscopic examination by a competent bacteriologist has demonstrated the absence of the Klebs-Löffler bacillus.—*F. C. Woodburn in Jour. Am. Med. Ass'n.*

THE ABSORPTION OF IRON.

The importance of iron in the nutrition of the animal body has long been recognized, but there has been many and varied speculations as to the way in which the iron is utilized by the system. Obviously, the bulk of the iron actually absorbed eventually enters into the hæmoglobin of the red blood corpuscles, and that, no doubt, represents one of the chief functions of this element. Still, it is to be remembered that when iron enters into an organic compound it cannot always be detected by the ordinary reactions, and hence we have to admit the possibility of its wide-spread distribution through tissues and organs hitherto considered free from this element. Indeed, Macallum has shown by the use of micro-chemical methods that the most important of all elements in the life of every cell is an iron-containing compound; even the prozymogens, if not the zymogens themselves, found in the various secreting glands, contain some iron, so that it is quite

possible that iron is essential for the life and well-being of every tissue cell.

To a person interested in nutrition, the question naturally arises how, and in what forms, is iron absorbed? Can the iron needed for the wants of the body be supplied by organic iron salts, or must it be introduced in the form of organic iron compounds? Further, assuming that the inorganic compounds are available for the needs of the organism, are they directly available or must they first be converted through synthetical processes into complex organic compounds before they can serve their full purpose as nutrients? These questions have been variously answered by different observers, so that at the present time our knowledge of this matter is in a somewhat uncertain condition.

In an article just published by Dr. Macallum, of the University of Toronto,* we

* On the Absorption of Iron in the Animal Body. *Journal of Physiology*, Vol. xvi., p. 268.

find recorded many interesting results bearing upon these questions; results well worthy of consideration, for they were obtained by carefully conducted feeding experiments followed by micro-chemical examination of the various tissues and organs. Experiments made with guinea-pigs, for example, show that when inorganic iron compounds are fed a certain amount of the iron is absorbed in the intestinal mucosa. Further, it was noted that the accumulation of iron in the mucosa, when the dosage was small, was limited to the sub-epithelial portions of the tips of the villi, the iron being deposited in leucocytes which in their disposition form a sort of cap for the extreme end of the lacteal vessel. That the iron in these leucocyte cells originates from the food was plainly apparent from the fact that the tips of the villi gave only a feeble reaction for iron when the animal was deprived of food for some days. In well-fed animals, on a normal diet, the iron reaction is most marked in that portion of the intestine closely adjacent to the pylorus; even ten inches away from the pyloric orifice the iron reaction may be entirely negative. When, however, inorganic iron compounds are fed, the area of absorption and the extent of the deposition of the iron are determined mainly by the nature and quantity of the compound given. Thus, when the amount of iron fed is large, the absorptive area may embrace the whole length of the small intestine, and the iron may be found not only in the underlying elements, where it seems to be specially transferred by the epithelial cells, but also in the epithelial cells themselves. This is explained by Dr. Macallum as follows: "The iron salt of the chyme, when the latter is thoroughly mixed with the biliary and pancreatic fluids, becomes wholly precipitated if the alkalinity of the two latter fluids is sufficiently great. The alkali present may be completely destroyed by a large quantity of iron salt in solution, and when this occurs the excess of the iron salt not precipitated and remaining in solution is absorbed. When the quantity in excess of that necessary to destroy the alkalinity is very great, all the villi of the intestine are in a position to absorb some of it. If, on the other hand, the dose is small, absorption in the upper end of the intestine is favored by the circumstance that the three fluids, chyme, bile and pancreatic juice, do not immediately and in-

timately mingle and, therefore, the iron is not at once precipitated, some of it being absorbed before that occurs. The quantity of acid in the chyme is a factor of some importance, and when the iron given is in the salt form and not as the oxide, the acidity of the chyme is not decreased, the acid of the salt displaced taking the place of the hydrochloric acid. When the oxide or the reduced metal is administered, their solution takes up a portion or all of the acid without contributing in turn to the acidity of the chyme, and, therefore, in the intestine the alkalinity of the bile and pancreatic juice goes further in the precipitation of the salts of iron in solution in the out-poured chyme. The larger the amount of free acid in the latter, the greater must be the quantity of iron absorbed."

When the amount of absorbed iron contained in the epithelial cell is small, that part of it in the lower end is dissolved in the protoplasm, but when the amount is large it appears to be precipitated in a granular form. The dissolved form of the iron compound is considered to be an albuminate, but the character of the granular form is less certain and it is equally difficult to determine the exact nature of the granular masses in the leucocytes below, although they are assumed to be of albuminative composition.

While the leucocytes plainly transfer the absorbed iron into the general circulation, it is probable that by far the greater portion of the absorbed iron, especially when the dosage is large, is carried from the villus by means of the blood-plasma and is then made use of as the requirements of the organism demand. In the words of Dr. Macallum, "It follows from the results of these experiments that inorganic and albuminate compounds of iron are absorbed, at least in the portions of the intestine near the pylorus, and in all parts of the small intestine where the iron compound is not precipitable on mixture with the bile and the pancreatic juice. Undoubtedly, also, sulphides in the bowel must remove from solution a quantity of iron in proportion to their abundance. In ordinary diet the extent of the mucosa which absorbs iron must be, in proportion to that which does not, remarkably small. It may possibly be that in the human subject when the iron is specially increased, the extent of the absorbing surface is increased, the more so when there is a di-

minution in the amount of pancreatic and biliary fluids, a condition possibly in anæmias. The view held by some that iron salts are not absorbed and that these exercise their effect by stimulating the mucosa to greater physiological activity, is opposed by the results of these experiments. If iron salts stimulate, it is because they penetrate the epithelium of the mucosa and in so doing are transferred to the underlying elements. In other words, they are absorbed. But the extent of the absorbing area is limited; so likewise must be the extent of the area supposedly stimulated and, therefore, the beneficial effects of the stimulation of the mucosa alone must be small. What, then, is the purpose served by the absorption of iron salts? Leaving out of consideration the possible answer that the iron of such combinations becomes assimilated; that is, is united in the animal cell with other constituents to form what the histologist calls chromatin, we may discuss some explanations of its effects. The experiments with the feeding of 'peptonate' and of albuminate of iron are, of course, too few to enable one to infer anything concerning the action of iron-holding proteids of this character, but all the experiments without exception indicate that the leucocytes have a special affinity for inorganic and albuminate compounds of iron, and it is not too much to infer that this affinity involves a stimulating or chemiotactic effect upon the leucocytes, and that iron salts exercise an effect on other cells corresponding to their function.

The number of leucocytes which are engaged at any one time in the absorption of iron is comparatively small, owing to the small extent of the intestinal mucosa bathed by a solution of an iron salt, and, therefore, the stimulating effect would appear to be small, but it must be remembered that, with the constant stream of iron-holding plasma and iron-holding leucocytes from the villi in the upper portion of the small intestine to the liver, spleen, etc., the other cells of the body, including leucocytes with little or no inorganic iron, are put in position to obtain some of that absorbed. There is also another way in which the question may be viewed. Inorganic compounds of iron, like those of calcium, potassium and sodium, have been since the dawn of animal life on the globe, constituents of its media and of its food, and it is possible that the animal cell has, in acquiring a

tolerance for them, accommodated its functions to their presence and has established with them a physiological equilibrium which it may be impossible to maintain in the absence of such compounds. The view that the iron of inorganic combinations goes directly into combination with nuclein and albumin to form chromatin, is one that may in the future be proved correct, but whether it will happen so or not, it is not now, nor apparently will it be then, incompatible with the explanation of other possible functions of iron salts like those just referred to."

Dr. Macallum's researches also show that when iron is absorbed in excess of the needs of the body it is excreted through different channels in different animals, dependent, apparently, upon the degree of activity which the organs present in different animals. In man, the liver and kidneys are most active in the excretion of iron.

In studying the absorption of organic iron compounds, Dr. Macallum employed representatives of the so-called assimilated compounds of iron, such as the nuclein bodies, commonly known as the chromations. After some successful feeding experiments with chromatin isolated by artificial gastric digestion, recourse was had to unboiled egg-yolk, which, according to Miescher, contains 1 to 1.5 per cent. of nuclein (hæmatogen.) This chromatin appears to exist in the egg-yolk partly in the form of granules and partly as a membrane to the contained fat globules, the latter being quite small and "shading off into the small granules in such a way as to suggest that the latter are also fat globules of almost infinitesimal size surrounded by chromatin." This material evidently undergoes absorption in the intestine of the guinea-pig, and when fed for some days upon the above food the cytoplasm of the liver cells yields marked evidence of the presence of an organic iron compound belonging to the "chromatin" class and derived from the yolk fed. As to the way in which the chromatin is observed no definite statement can be made, but apparently the process is connected with the absorption of the fat with which the iron compound is closely associated in the yolk. Evidently, then, both simple iron salts and organic iron compounds can be absorbed and utilized by the animal organism. There are still, however, many questions to be answered relative to the way in which the iron serves its purpose in the economy.

VACCINATION AND REVACCINATION.

The periodic recurrence of more or less extensive epidemics of small-pox in various countries, even in those where vaccination is popularly believed to be very generally employed as a prophylactic, justifies also the periodic repetition in the medical and lay press of some of the very instructive and conclusive facts furnished by vaccination which it seems to us should set at rest forever any doubt or skepticism concerning the protective value of vaccination—were it not that these incredulities seem also to follow some law of periodicity as to their development and dissemination.

The experience we have recently had with small-pox in the United States, and the blatant illogical opposition to the practice of vaccination as not only possibly injurious but probably, also useless—which we occasionally hear voiced in diverse publications, (happily usually foreign)—suggest to us the advantage of printing for the benefit of our readers an extract from a most carefully prepared comparative analysis of the results of vaccination and revaccination, by Dr. Goldschmidt of Strasburg, 1890.

It is, however, as a strong argument in favor of obligatory vaccination and *revaccination* that we would commend this abstract to the attention especially of those of our readers who interest themselves in shaping and aiding the enactment of legislation for the benefit of the public health.

The memoir in question contains (*Rev. de Méd.*, 1890, pp. 315-351) a large number of statistical documents upon the subject, among which are some most striking. From them it is shown that the city of Paris alone has more deaths from small-pox annually than has the whole German Empire.

Germany is the sole country where compulsory vaccination and *revaccination* has been practiced since 1875, a glance at the following table shows the striking result of this practice as a means of effectually exterminating small-pox.

ANNUAL AVERAGE OF DEATHS FROM SMALL-POX
AMONG 100,000 INHABITANTS.

Prussia, 1860-69, before the compulsory law	33.84
Prussia, 1875-84, after vaccination and revaccination (compulsory)	2.23
Berlin, 1875-84, " " "	1.68
Dresden, " " "	1.48
Breslau, " " "	1.61
Bavaria, " " "	1.11

Paris, 1875-84, vaccination voluntary.....	28.95
Paris, 1887, " " "	17.20
Vienna, 1875-84, " " "	84.37
Austria, 1875-84, " " "	61.64
England, 1875-84, one vaccination obligatory	7.61
London, 1875-84, " " "	25.50
London, 1887, " " "	0.20

In 1886, in all Germany there died of small-pox 193 inhabitants, that is to say 0.4 per 100,000, a smaller number than that furnished by the city of Paris where there were during that year 218 deaths from the same disease; again, for the year 1887 the numbers were respectively 168 and 389. At Marseilles in 1886 there were 2,051 deaths from small-pox, a proportion of 545.3 per 100,000; it is true, however, that during the following year there were only 63 deaths; from the same disease or 16.7 per 100,000. But during this time there was only one death by the same cause at Berlin (0.07) and none at Dresden, Cologne, Breslau and Frankfurt.

In the Prussian army 300,000 strong, from 1886-84 there was not a single death from small-pox, and there was only one in 1885 notwithstanding a total of 135 cases of the disease in ten years.

In the French army which counted an average of 460,000 souls, from 1876-85 there was an average of 627 cases and 54 deaths of small-pox per year, that is 12 deaths per 100,000 men. But in this period of ten years, with the extension of the practice of revaccinations, the number of deaths had been constantly decreasing, from 227 in 1879 to 6 (with 214 cases) in 1886; with the result that for the last two years the proportion was only one death per 100,000 men. It should not be surprising that, in the midst of the civil population of France which still suffers so much from small-pox, the French army furnished a larger number of cases and deaths of small-pox than does the German which is almost free from exposure to this contagion from the population which surrounds it. There exists in France no statistics which show the exact number of deaths from small-pox among the total population of the country.

Although the German law of April 8, 1874, makes vaccination and revaccination compulsory, as a matter of fact, 10.51 per cent. of the whole number of young child-

ren available for a primary vaccination and 3.5 per cent. of all the children of 12 years available for revaccination escape both of these protective operations. Variola may therefore still exert its malignant influence even in Germany upon a number of subjects—collectively large—upon whom vaccination has not conferred or has not restored immunity. Thus, in 1886 and 1887, infants from one to three years of age furnished nearly half the deaths from small-pox in Germany. In the latter country the practice of vaccination from arm to arm (with the so-called human virus) has greatly and constantly diminished since the compulsory law was enacted. For example, in 1879 the animal virus was used for only 2.50 per cent. of the children vaccinated; while in 1885 it was used in 33.10 per cent. of such operations. (Later statistics show a still more marked decrease in the use of human virus.) The objection raised in some quarters, especially, in some of the densely ignorant manufacturing districts of England, to the possibility through carelessness of the inoculation of loathsome constitutional diseases with the human virus certainly cannot have even any fancied weight when animal virus is used.

In Alsace-Lorraine the proportion of successful primary vaccinations has been 95 per cent.; for the *revaccinations*, it was 75.3 per cent. in 1885, 71.4 per cent. in 1886 and 79.6 per cent. in 1887. At Strasburg upwards of 8,000 children of 12 years of age *revaccinated* either from arm to arm with the human virus or directly with the animal virus, Dr. Goldschmidt obtained a proportion of success which varied from 79.80 to 75.59 per cent. This is large and is above that which has been usually obtained in France, but it is scarcely equal to that obtained by the *revaccinations* in Germany. It is true that the *revaccinations* take place at 12 years of age in Germany, while the figures in the French army (about 60 per cent.) concern young men from 20 to 21 years of whom doubtless a certain number have been already vaccinated before entering the service.

Dr. Weil, Cantonal physician in Hagenan, cited by Goldschmidt, for 2,111 subjects *revaccinated* obtained a proportion of success which increased with the age of the subjects as indicated by the following table:—

Revaccinated.	Percentage of success.
From 6 to 7 years old	32.60
" 7 to 8 " "	64.00
" 8 to 9 " "	72.52
" 9 to 10 " "	79.63
" 10 to 11 " "	85.94
" 11 to 12 " "	88.64
Adults	90.00

The greater number of the 368 adults *revaccinated* had been vaccinated only in their early infancy and had certainly not been *revaccinated* previous to the operation in question.

These facts, and others like them which are accumulating constantly, prove the absolute necessity of *revaccination*, since they show that in 85 to 90 times in the 100 the immunity against small-pox conferred by the first vaccination has disappeared in twenty years; they also demonstrate in a most striking manner how certain a measure of public defense against the spread of small-pox is *compulsory* and *revaccination*. — *Dietetic and Hygienic Gazette*.

Catarrhal Jaundice.

R	Sodii phosphat.....	℥iiss
	Sodii salicylat.....	℥iij
	Aquæ distillat., q. s.....	℥viij

M. Sig.—Tablespoonful in one-half glass of water after each meal.

Sugar as a Food.

Some recent results published by Dr. V. Harley, in the proceedings of the Royal Society of Great Britain, bearing on the influence of sugar as a food in the production of muscular work are full of interest. "The conclusions of his experiments, which were performed on himself with Mosso's eigograph are as follows: (1) Sugar when taken alone is a muscle food; 500 grams (7½ ounces) of sugar increased the amount of muscular work done on a fasting day, from 61 to 76 per cent. (2) The muscle energy-producing effect of sugar is so great that 200 grams (7 ounces) added to a small meal increased the total amount of work done from 6 to 30 per cent. (3) That when sugar was added to a large meal it increased the total amount of work done from 8 to 16 per cent. (4) That the work done during a period of eight hours can be increased from 22 to 36 per cent. by taking 250 grams (8½ ounces) of sugar. (5) That when sugar is taken at 3.50 p. m., it not only obliterates the diurnal fall in the muscular power, which usually occurs at 5.30 p. m., but even causes an actual increase in the total amount of work done." — *Dietetic and Hygienic Gazette*.

Night-Sweats of Phthisis.

M. Alb. Robin (*La Médecine Moderne*) prescribes:

R	Pulv. agarici.....	gr. viij
	Zinc. oxid.....	gr. iiss
	Pulv. camphor.....	gr. ¼

M. Sig.: For one cachet. To be taken on going to bed.

CURRENT LITERATURE REVIEWED.

IN CHARGE OF ELLISTON J. MORRIS, M. D., AND SAMUEL M. WILSON, M. D.

THE VIRGINIA MEDICAL MONTHLY

For June contains a paper on

The Radical Cure of Aural Polypsi.

by Dr. T. T. Churchman. The author states that after the ordinary methods have been tried faithfully without success, he advises the removal of the drum with one or more of the ossicles. In this way, by the removal of the polypus, drum, and one or more of the ossicles, the discharge will be cured and the recurrence of the polypus thereby prevented. In these cases where free drainage can be established, the author does not attempt to destroy the pedicle, for by the use of the proper antiseptic washes the exciting cause will be removed and the pedicle will atrophy and disappear.

Dr. Q. C. Smith contributes an article on

Placenta Prævia: How to Treat it.

If the cervix is relaxed so that the finger can be passed through it, the author advises that the finger be passed through the placenta and the waters evacuated, firm, steady, continued pressure being made over the fundus till other hæmostatic measures can be brought to bear. If the cervix is so small and rigid that the finger cannot pass through it then the author advises that the cervix be douched with what he terms "hop styptic water" (hot solution of alum) until the hemorrhage is partially or entirely stanch. The patient is then to be placed in the Sims' position, a speculum introduced and the hot styptic water injected through the cervix until all the hemorrhage ceases. The bladder is then emptied by means of a catheter and three to five grains of muriate of quinine and urea administered hypodermically and hot whiskey toddies given till the patient is well under the narcotic and anæsthetic effect of the whiskey. If the cervix is still very rigid, a drachm of fluid extract of ipecac is to be given, as the author believes that large doses of ipecac are far more hæmostatic and equalizing of nervous force than are small ones.

The cervix is now to be dilated using all the time the hot styptic water, and the placenta separated by means of a properly curved Simpson sound. The cervix is to be farther dilated by means of Barnes' rubber dilator. As soon as the cervix is sufficiently dilated and labor pains have come on with regularity the bags are removed, the placenta punctured with the finger and the presentation of the child discovered if possible. The child can then be delivered by the feet or by forceps as seems necessary.

Dr. J. Wesley Bovee discusses

The Conservative Treatment of Cancer of the Uterus.

The author urges the importance of a total hysterectomy so soon as the disease is dis-

covered. He has little faith in the treatment by aniline preparations, at present in vogue in Europe, though it seems to retard the progress of the growth and render it less painful, and is therefore applicable to cases advanced beyond surgical aid. No remedy has yet been found that can compare at all favorably with surgical treatment, either as a radical operation for cure or for the removal of as much as possible of the diseased structures. We may reasonably hope for cure of cancer in the uterus if early extirpation be resorted to, but in the incurable condition our objects are to make the sufferer as comfortable as we can, and to prolong her life as much as possible.

Dr. M. W. O'Brien contributes an article on the

Treatment of Crushes of the Hands and Feet.

The author does not think that a hand crushed in the bumpers of a railroad car can be made surgically clean by any immediate washing or soaking in even the best hot antiseptic washes, so that a dry dressing can be put on as usually described and all go well. He has tried it many times, he states, and has had pus and fever and chill, so that the dressing had to come off and another course inaugurated.

The hot sublimate water dressing in crushes about the extremities is the ideal dressing, and has saved many hands and feet that, with any other line of treatment, would have come off at the point of selection.

In dressing a hand or foot in this way first thoroughly wash and steam it with hot sublimate water (1 to 2,000); then, if any part is to be removed, trim it off and envelop the whole injured member in plenty of absorbent cotton, holding it in place by wrapping it with ordinary sewing cotton; put the part at rest comfortably on a sheet of rubber to carry the solution into a convenient receptacle, and assiduously soak it, at regular intervals, with 1 to 4000 sublimate water as hot as can be borne. By this means fever disappears, the circulation is coaxed into damaged tissues, granulations spring up, and the part is restored—this, too, without changing the line of local treatment except in degree.

There is one other fact in his experience in these injuries he thinks worthy of note. He has seen only one case of tetanus result out of a total of several hundred cases in the last ten years. This looks as though tetanus was exceedingly rare among injured railway men, though he does not see why it should be when all things are considered in connection with these cases.

Dr. George M. Kober continues his article entitled

A Study of the Soil in Relation to Health and Disease

Examination of the Soil.—A complete sanitary investigation should include the following points, viz:

(1) The configuration of the locality, height above the sea level, angle of declivity, facilities for natural drainage, water-sheds and courses, covering of soil by trees, brushwood, and grasses.

(2) Geological formation, dip and character of strata, especially in reference to their permeability.

(3) Examination into the size of the fragments or grains composing the soil is readily conducted by means of graduated sieves and a low power of the microscope.

(4) The porosity of the soil is usually determined by taking a liter of kiln-dried soil and ascertain how much water is taken up. The water must be added until air-bubbles cease to form. This is a simple, but not the most exact method.

(5) The moisture of the soil is determined by weighing a certain quantity; it is then exposed to a temperature of 220 until dry, and weighed again; the difference is water or some other volatile substance.

(6) The capacity of the soil for holding water is ascertained by thoroughly wetting a certain quantity previously weighed, drain off the water, and weigh again. This is not a precise method.

(7) *Measurement of the Ground-Water.*—The height of the water-level in wells is the best indication of the height of the ground-water. Pettenkofer uses a rod for shallow wells and a cord for deep wells, to which are attached a number of little cups, which are let down into the well and drawn up again; the uppermost cup containing water, marks, of course, the height of the water, the length of this measure being known, the changing level of the well can be estimated to within one-half inch. Some precautions are necessary; for if a rope is used, it may stretch after prolonged use or during a hot wind, or shrink in wet weather, and thereby render the observations inaccurate, but not sufficiently so for practical purposes. It is best to use a rod in shallow wells, and the measurement should be made at a time when the supply has not been lowered by unusual consumption.

(8) *The ground air* is examined by sinking a shaft about sixteen feet deep, into which are placed lead pipes in 1½ feet, three feet, seven feet, nine feet, and fifteen feet lengths, and one-half inch in diameter. The soil is put back as nearly as possible into the original levels. The lead pipes are connected with an aspirator by means of rubber-tubing, and the aspirated air is examined for the determination of oxygen, carbonic acid, ammonia, hydrogen sulphide, and organic matter. The movements of the ground-air are determined by differential manometers.

(9) *Soil-pollution* is determined by a chemical analysis for the estimation of nitrogen and carbon. A simple way to ascertain the percentage of volatile matter is to take ten grammes of dried pulverized soil, incinerate at a red heat, recarbonate with carbonic acid solution or ammonia carbonate; heat again to expel excess of ammonia and weigh. The loss represents the amount of organic matter. The permanganate process is also applicable.

(10) The *micro-organisms* of the soil are best determined by using a borer invented by Frankel, and constructed on the principle of a butter-tester. This borer must be sterilized, and can be inserted to any desired depth. Upon withdrawal of the instrument, Frankel measures off, by means of a sterilized platinum spoon, a given quantity of the soil, and places it in a nutrient gelatine-culture tube, and shakes the mixture well. A small quantity of this is placed on glass plates under a damp glass air-chamber; and after the formation of the colonies, they are counted and isolated in the usual manner. The platinum measures hold about two grains of soil, as a larger amount would render the culture experiment very difficult and confusing because of the number of micro-organisms present.

(11) *The temperature of the soil* can be readily determined at any desired depth by placing a self-registering thermometer, properly protected, in a "drive well point joint."

Dr. Julius C. LeHardy in a paper entitled "Yellow Fever—Its Relations to Climate and to Hygienic Measures in the United States," after reviewing the various outbreaks of this disease, gives as his opinion that yellow fever acts, in every respect, like other epidemic diseases; its occurrence depends entirely upon the condition of the place. If cleaned and properly drained, the disease will not propagate whether in northern or southern latitudes, whatever may be the amount of rainfall, the heat of the sun, or the number of persons brought in with the disease.

The remaining papers in this issue are: "Auscultation of the Heart", by Dr. E. M. Macgruder; "Clinical Lecture on Hernia," by Dr. W. B. DeGarmo.

Under "Clinical Reports" is given a "Case of Dorsal-Lumbar Spondylitis" illustrating the value of the jury mast, by Dr. Wm. J. Crittenden.

IN THE TEXAS SANITARIAN

for May is a paper by Dr. F. C. Osborn entitled

Can Small-Pox be Aborted?

The paper is the history of a man vaccinated on the tenth day after exposure to small-pox and given one dose of calomel, and daily doses of hyposulphite of soda.

One week later the patient felt unwell, had headache, backache, nausea, temperature of 103°, and pulse of 92. A bath of warm water and soap was given, and a dose of calomel and ipecac.

In the evening the temperature was the same; but the face, neck, and chest were crimson, the lips swollen and sore, the tongue coated in the middle with white fur and intensely red at the edges, conjunctivæ injected, and the eyelids giving pain when moved. The bowels had opened.

The author thinks variola primarily a skin affection, and the constitutional disturbance secondary to it, and, expecting a variolous rash, he sponged his patient twice, once with a ten per cent. (sic) solution of bichloride, and allowed it to dry. Mouth, ears, nose

and eyes were washed with a solution of peroxide of hydrogen, and the great frothing following this showed its contact with pus or membranes full of bacteria, as otherwise it would be very scanty.

Seen the next morning the patient felt and looked well, had normal pulse and temperature and complained only of loss of sleep due to the prickling from the bichloride.

In this connection the author mentions curing a case of screw worms in the nose of a human being by injecting peroxide solution.

Other papers in this number are "The Nations Sin of Omission," by Dr. T. J. Bennett, an article on the necessity of a law restricting the practice of medicine by unqualified men. "The Conservation of Nervous Energy," by Prof. E. L. Blackshear. "Women and Sanitation," an editorial noting the increased interest shown in sanitation since the women of the country have taken steps to assist in perfecting it, and suggesting a radical change in the upholstery and general construction of sleeping cars.

IN THE JOURNAL OF CUTANEOUS AND GENITO-URINARY DISEASES

for June is an article by Dr. Eugene Fuller on
Chronic Seminal Vesiculitis.

The author states that, since the use of the electric endoscope is becoming more common, the so-called incurable urethral discharges are less frequently heard of, and yet we occasionally hear still of cases, which, after treatment for some time by well-known surgeons, were so obstinate that the patients gave up in despair, and finally, in some cases, seemed to cure themselves by venereal, or alcoholic excess, or a combination of these.

Success followed the treatment of many of these cases by stripping the seminal vesicles free from the pus which they usually contain, in this condition, by introducing the forefinger into the rectum. The method advocated differs essentially in object and procedure from the prostatic massage in use by some Russian authorities, and does not, as some suppose, require the possession of an unusually long forefinger. In fact the author thinks that a man possessed of even a short finger can by gentle persistence succeed in reaching and emptying the vesicles, if they are unhealthy. In cases where the patient is stout and muscular, the reinforcement of the surgeon's arm by his knee, as a rest, may be required at the first visit or two. When the vesiculae are inflamed and the stripping is properly done, the pus and sometimes some blood, empties from the meatus. If, after this treatment has been used for a time, tenderness begins to increase, too much force has been used, and complete rest for a time is necessary. Typical cases are cited to show the symptoms to be expected and the results of treatment. The article will be continued later.

Dr. E. J. Stout reported a case of

Vanthoma Multiplex

The patient was a married seamstress of 50 years, who complained that one month after

an attack of grippe, four years ago, she had a general jaundice. She has had rheumatism and, three years ago, syphilis.

The woman is five feet and one inch tall, is poorly nourished, and weighs one hundred and twenty-five pounds. She has headache, which has been much relieved by cutting the hair short. She feels drowsy during the day and falls asleep if not employed. Her general health is good, temperature normal, pulse sixty-four, appetite good, tongue badly coated, bowels regular, though the passages are diarrhoeic and sometimes dark, sometimes clay colored. The patient is the color of a mulatto, and both conjunctivæ and mucous membranes of mouth are deeply jaundiced.

The rest of the body also is involved, but the legs and feet less than elsewhere.

Liver dullness, in the recumbent posture, begins in the sixth interspace, both anteriorly and posteriorly. In the normal position of the gall bladder is a very hard mass extending three quarters of an inch from the margins of the ribs.

There is no ascites. Examination of urine shows bile pigment, albumen, but no sugar; the specific gravity is (1010) and the reaction neutral. Nodular masses are felt on palpating the liver. The blood contains 4,640,000 red corpuscles per cu. cm. without increase of white corpuscles. Estimated hæmoglobin 60 per cent.

In February 1893, there appeared at the inner canthi of both eyes lesions of xanthoma palpebrarum, consisting of slightly elevated lemon yellow plates, about the size of a pea. The mucous membranes of the conjunctivæ and oval cavity, and the cornea are free from any similar growths. Along the natural furrows of the skin on the palmar surface of the hands, fingers, and the internal surface of the thumb are numerous similar lesions. The dorsal surface of the thumb and the knuckles of every finger are shedded with numerous similar lesions, varying in size from a millet seed to a large pea, and are velvety to touch.

On the dorsal surfaces the growths are lemon yellow, on the palms they vary from yellow to rose color. These growths do not coalesce and do not contain any liquid, but the patient complains of their itching and interference with work.

Below the right ear and along the angle of the jaw, and the inner border of the sterno-mostoid muscle similar growths vary in color from yellow to pink, and along the upper and interior borders of the scapulae, along the arms near the axillæ, and along the extensor surfaces of the elbows these eruptions are arranged with considerable symmetry—resembling herpes to a great extent.

No history throwing any light on this disorder has been obtained from the patient, and no change, except that caused by excising a few lesions, has taken place while the patient has been under observation.

This disease, known under the following synonyms: Vanthelasma, vitiligoides, molloscum cholesterique, fibroma lipomatodes,

and defined by Virchow as a fibro-fatty neoplasm forming yellow plates or tubercles in the corium, has been regarded as an uncommon disorder, and the form most usually found is known as *Xanthoma Palpebrarum* and occurs as plates on the left upper eyelid, near the inner canthus.

When the disease takes an inflammatory form, fatty degeneration overtakes the leucocytes before they form tissue and they

disappear as oil-drops, calcareous masses and cholesterine.

Hollopean thinks these benign neoplasms originate in embryonic generative fat cells, which persist and proliferate, and that the jaundice sometimes accompanying the trouble is due to the same cells in the bile ducts, and the glycosuria to their appearance in the pancreas. The etiology is still obscure however.

PERISCOPE.

IN CHARGE OF WM. E. PARKE, A.M., M. D.

MEDICINE.

Insomnia of Old Age.

Dr. J. W. Dale, in the *University—medical—magazine*, recommends very highly the use of morphia with a small amount of Dover's powder for the relief of the sleeplessness which is frequently one of the most serious complaints of the aged. The ordinary hypnotics, such as the bromides, chloral, and the numerous coal-tar derivatives, answer well for temporary purposes, but not where the demand is long continued. Dr. Dale gives at first from the 24th to the 12th of a grain of morphia, with two or three grains of the Dover's powder. This amount will need to be increased slightly as the patient becomes accustomed to it, but the doctor has found that even after a number of years, patients do not require an increase beyond a quarter of a grain of morphia and ten grains of the Dover's powder. Its use, he has found, is best limited to persons over 70 years of age, at which time of life its regular use is tolerated with impunity, and he has never found it to do any injury. The object in using the Dover's powder is to increase the bulk of the medicine, so that the patient will not be apt to increase the dose. Any particular increase would result in nausea from the presence of the ipecac. In addition to this, the small amount of ipecac present tends to maintain healthy action of the skin, and stimulate the stomach and the functional activity of the liver, as well as to diminish the tendency to constipation.

NEWS AND MISCELLANY.

DEER PARK

ON THE CREST OF THE ALLEGHENIES.

To those contemplating a trip to the mountains in search of health and pleasure, Deer Park on the crest of the Allegheny Mountains, 3,000 feet above the sea level, offers such varied attractions as a delightful atmosphere

during both day and night, pure water, smooth, winding roads through the mountains and valleys, and the most picturesque scenery in the Allegheny range. The hotel is equipped with all adjuncts conducive to the entertainment, pleasure and comfort of its guests.

The surrounding grounds, as well as the hotel, are lighted with electricity. Six miles distant on the same mountain summit is Oakland, the twin resort of Deer Park, and equally as well equipped for the entertainment and accommodations of its patrons. Both hotels are upon the main line of the Baltimore and Ohio Railroad, have the advantages of its splendid Vestibuled Limited Express trains between the East and West. Season excursion tickets, good for return passage until October 31st, will be placed on sale at greatly reduced rates at all principal ticket offices throughout the country. One way tickets reading from St. Louis, Louisville, Cincinnati, Columbus, Chicago, and any point on the B. & O. system to Washington, Baltimore, Philadelphia or New York, or vice versa, are good to stop off at either Deer Park, Mountain Lake Park or Oakland, and the time limit will be extended by agents at either resort upon application, to cover the period of the holders visit.

The season at these popular resorts commences June 23d.

For full information as to hotel rates, rooms, etc., address George D. DeShields, Manager, Deer Park, or Oakland, Garrett County, Maryland.

SUMMER VACATION TOURS.

The Baltimore and Ohio R. R. Co. now has on sale at all its offices east of the Ohio River a full line of tourist excursion tickets to all the lake, mountain and seashore resorts in the Eastern and Northern States and in Canada. These tickets are valid for return journey until October 31st. Before deciding upon your summer outing it would be well to consult the B. & O. Book of "Routes and Rates for Summer Tours." All B. & O. Ticket Agents at principal points have them, and they will be sent post paid upon receipt of ten cents, by Chas. O. Scull, General Pass. Agent, B. & O. R. R., Balto., Md.